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BOROFKY, Arnold J.  
The Factors Associated with Pupils whose Achievement in Grade-Nine Science Differs Greatly from that Indicated by their Level of Intelligence

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THE FACTORS ASSOCIATED WITH PUPILS  
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THESIS

THE FACTORS ASSOCIATED WITH PUPILS WHOSE ACHIEVEMENT  
IN GRADE-NINE SCIENCE DIFFERS GREATLY FROM THAT  
INDICATED BY THEIR LEVEL OF INTELLIGENCE

Submitted by  
Arnold J. Borofsky  
(S. B. Northeastern University, 1943)

In partial fulfillment of requirements for  
the degree of Master of Education

1949

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## ACKNOWLEDGMENTS

During the preparation of this study, the patient guidance, unfailing assistance, and inspiration of Dr. Roy O. Billett have played an important part. The writer is indebted to Mr. Ralph A. Eaton and Mr. Harold E. Cowan, principal and sub-master of Dedham High School, respectively, for making records available and to the teaching staff of Dedham High who willingly aided in the rating of pupils' traits and in furnishing additional data.





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## CHAPTER I

### THE METHODS AND SCOPE OF THIS THESIS

#### The Purposes and Cases of This Study

The purpose of this study.-- The object of this thesis is to study the characteristics of pupils whose marks in ninth-grade science vary from their intelligence quotients by two standard deviations or more. An effort will be made to find the significant characteristics of two groups:

1. Pupils whose marks place them in an achievement group at least two standard deviations higher than their intelligence-quotient groups, and
2. Pupils whose marks place them in an achievement group at least two standard deviations lower than their intelligence-quotient groups.

Number of cases.-- The achievement of 36 pupils, out of a total of 334 pupils enrolled in grade-nine science in the public high school in Dedham, Massachusetts over a three-year period, deviated by two or more groups from their intelligence-quotient groups. In 17 of the cases, the pupils' achievement groups are at least two groups higher than their intelligence-quotient groups; 19 of the cases represent pupils whose achievement groups are at least two groups below their intelligence-quotient





groups.

### The Methods of This Study

Methods of solving this problem.-- The factors associated with abnormal achievement at a given level of intelligence were determined in this study in two ways. First, a review of the literature on the factors associated with achievement was made and is summarized in chapter two. From the studies of the previous researches, it was apparent that as many significant facts as possible should be obtained for the cases of this study under each of the following classifications: census information, recreation and leisure activities, school history and study habits, future plans, immediate family, environment, behavior characteristics and personal traits, mental data, associates, and health and physical data.

Secondly, a comparison of the case histories of the 17 pupils whose accomplishment in ninth-grade science place them in an achievement group at least two standard deviations higher than their intelligence-quotient groups with the case histories of the 19 pupils whose accomplishment in ninth-grade science place them in an achievement group at least two standard deviations lower than their intelligence-quotient groups. The case histories are set forth in the third chapter.

Measurement of achievement in grade-nine science.--



The achievement of pupils in grade-nine science was evaluated by objective tests<sup>1/</sup> covering the various units of the course. These tests, which were devised by the teacher, consisted of true-false, modified true-false, multiple choice, and completion items. All test items used in each objective test were subjected to an analysis of item validity each year using the method described by Greene, Jorgensen, and Gerberich<sup>2/</sup>. Items with a discriminative power of 20 per cent or less were rejected or revised prior to use the following year. The items of the resulting tests have a range of difficulty from about 10 per cent successful responses to about 90 per cent successful responses; the average difficulty of all items approximating 50 per cent successful responses.

Tests were rated by comparison with previously compared scoring keys. The numerical score on each test is the number of items correctly answered by the pupil. The sum of the numerical scores for the first half-year of each pupil was used as the index of achievement in grade-nine science for the purposes of this study.

The use of first half-year scores as index of achieve-

1/ A copy of each objective test given during the first half-year of the third year of this study is shown in Appendix I.

2/ Harry A. Greene, Albert N. Jorgensen, J. Raymond Gerberich, Measurement and Evaluation in the Secondary School. Longmans, Green and Company, New York, 1946, p. 80-81.



ment.-- During the first two years of the period covered by this study, the writer has found that the marks assigned for the first half-year in grade-nine science have a coefficient of correlation of 0.96 with the yearly mark. The calculation of the correlation coefficient is shown in Appendix II. Thus, the first half-year achievement used in this study closely represents the yearly achievement of these pupils.

The coefficient of correlation was determined by the Pearson Product-Moment Method involving the solution of

the following formula:<sup>1/</sup> 
$$r = \frac{\sum xy - c_x c_y}{SD_x \cdot SD_y}$$

in which  $r$  is the coefficient of correlation,  $N$  the number of cases,  $SD_x$  the standard deviation (in steps) of the distribution on the x-axis,  $SD_y$  the standard deviation (in steps) of the distribution on the y-axis,  $c_x$  the correction of the x-axis,  $c_y$  the correction of the y-axis, and  $\sum xy$  the sum of the products of the deviation of each measure from the central tendency of the x-axis and the y-axis."

Measurement of intelligence quotient.-- The mental ability of the pupils was evaluated by use of the Otis Classification Test (revised), forms R, S, and T.<sup>2/</sup> The tests were given to the pupils under the supervision of the junior-high-schools supervisory principal from 6 to 1/ Ibid, p. 557.

<sup>2/</sup> The intelligence quotient as determined from the Otis Classification Tests is not a quotient. "If there is any objection to calling this measure an 'intelligence Quotient' or an 'IQ', it can be called an index of brightness." See Arthur S. Otis, Manual of Directions for Otis Classification Test, World Book Company, Yonkers, New York, 1941, p. 16.





18 months prior to the time at which the achievement of the pupils was investigated. About one-third of the pupils were tested twice within a few months time. For these pupils the higher intelligence quotient was chosen for the data of this study.

Grouping of the cases for this study.-- Each pupil was classified in one of five achievement groups. Achievement group I, consisted of those pupils who have done exceptional work in grade-nine science; achievement group II, of those pupils whose work in ninth-grade science was above average; achievement group III, of those with average achievement; achievement group IV, of pupils whose work was below average; and achievement group V, of pupils whose achievement was not passing.

Each pupil also was classified in one of five intelligence-quotient groups. Intelligence-quotient group I consisted of those pupils whose intelligence quotients indicate superior intelligence; intelligence-quotient group II, of those pupils whose intelligence level is above average; intelligence-quotient group III, of pupils with average intelligence; intelligence-quotient group IV, of those with below average intelligence; and intelligence-quotient group V, of those pupils whose intelligence is dull or borderline. The nomenclature of these intelligence-quotient groups is adapted from those of Terman and



Merrill<sup>1/</sup>.

The method of determining the range and limits of achievement groups.-- The range and limits of each achievement group in terms of the aggregate numerical scores for the first half-year in grade-nine science were determined as follows: A grouped frequency distribution of the aggregate numerical achievement in ninth-grade science for the first half-year for each of the three school years was made. The size of the class-interval was chosen to result in from 15 to 25 steps. The arithmetic mean (A. M.) and the standard deviation (S. D.) for each grouped frequency distribution were computed using the formulae:

A. M. = assumed mean +  $s \frac{\sum fd}{N}$  and

S. D. =  $s \sqrt{\frac{\sum fd^2}{N} - \left( \frac{\sum fd}{N} \right)^2}$  where " $\sum fd$ " equals the algebraic sum of the products of the frequencies at each step by the deviation of each step from the assumed mean,  $\sum fd^2$  equals the sum of the products of the frequencies at each step by the square of the deviation of each step from the assumed mean, N equals the number of cases in the distribution, and s equals the size of the class interval of the distribution."<sup>2/</sup>

The grouped frequency distributions and the computations of the arithmetic means and the standard deviations from them are shown in Appendices III, IV, and V.

The range, limits and distribution of pupils in

<sup>1/</sup> Lewis M. Terman and Maud A. Merrill, Measuring Intelligence. Houghton Mifflin Company, Boston, 1937, p. 38-41.

<sup>2/</sup> Greene, Jorgensen, and Gerberich, op. cit. p. 546.

The following table shows the results of the experiments conducted on the effect of temperature on the rate of reaction between hydrogen peroxide and potassium iodide. The reaction is catalyzed by the presence of a small amount of potassium iodide.

| Temperature (°C) | Time taken for reaction to complete (s) |
|------------------|-----------------------------------------|
| 10               | 120                                     |
| 20               | 60                                      |
| 30               | 30                                      |
| 40               | 15                                      |
| 50               | 8                                       |

From the above table, it is evident that the rate of reaction increases with an increase in temperature. This is because the molecules of the reactants possess more kinetic energy at higher temperatures, which enables them to overcome the activation energy barrier more easily.

The activation energy of the reaction can be determined by plotting the logarithm of the rate constant (log k) against the reciprocal of the absolute temperature (1/T). The resulting straight line will have a negative slope, and the activation energy can be calculated from the slope of this line.

The following table shows the values of log k and 1/T for the above experiments:

| Temperature (°C) | 1/T (K <sup>-1</sup> ) | log k |
|------------------|------------------------|-------|
| 10               | 0.0028                 | 1.07  |
| 20               | 0.0029                 | 1.20  |
| 30               | 0.0030                 | 1.33  |
| 40               | 0.0031                 | 1.46  |
| 50               | 0.0032                 | 1.59  |

The activation energy of the reaction is found to be 50 kJ/mol.

in achievement groups.-- The limits of each achievement group in terms of standard deviations from the mean achievement is shown in Table 1. Each achievement group covers a range of one standard deviation; the arithmetic mean serves as the mid-point of achievement group III.

Table 1. The Limits of Each Achievement Group in Terms of Standard Deviations from the Mean Achievement.

| Achievement Group | Limits of Achievement Groups in Terms of Standard Deviations From the Mean Achievement |
|-------------------|----------------------------------------------------------------------------------------|
| (1)               | (2)                                                                                    |
| I.....            | $+1\frac{1}{2}$ or higher                                                              |
| II.....           | $+\frac{1}{2}$ to $+1\frac{1}{2}$                                                      |
| III.....          | $-\frac{1}{2}$ to $+\frac{1}{2}$                                                       |
| IV.....           | $-1\frac{1}{2}$ to $-\frac{1}{2}$                                                      |
| V.....            | $-1\frac{1}{2}$ or lower                                                               |

The limits of each of the five achievement groups in terms of aggregate numerical scores for the first half-year are shown in Table 2. The actual distribution of pupil achievement in each of the five achievement groups combined for the three-year period is shown in Figure 1.

The method of determining the range and limits of intelligence-quotient groups.-- Pupils were classified in one of five intelligence-quotient groups by statistical techniques identical to those employed in the classification of pupils in achievement groups. A grouped fre-

4. The fourth part of the document addresses the challenges of data security and privacy. It highlights the need for robust security measures to protect sensitive information from unauthorized access and the importance of complying with relevant regulations.

5. The fifth part of the document provides a summary of the key findings and conclusions of the study. It reiterates the importance of data accuracy, the effectiveness of modern analysis techniques, and the ongoing need for security and privacy protections.



Table 2. Limits of Achievement Groups in Terms of Aggregate Numerical Scores on Objective Tests for the First Half-Year in Grade-Nine Science.

| Achievement Group | Limits in Terms of Aggregate Numerical Scores for the First Half-Year as Measured by Objective Tests |               |               |
|-------------------|------------------------------------------------------------------------------------------------------|---------------|---------------|
|                   | School Year                                                                                          |               |               |
|                   | 1946-47                                                                                              | 1947-48       | 1948-49       |
| (1)               | (2)                                                                                                  | (3)           | (4)           |
| I.....            | 237 and above                                                                                        | 250 and above | 326 and above |
| II.....           | 184 to 236                                                                                           | 206 to 249    | 271 to 325    |
| III.....          | 132 to 183                                                                                           | 161 to 205    | 216 to 270    |
| IV.....           | 79 to 131                                                                                            | 117 to 160    | 161 to 215    |
| V.....            | 78 and less                                                                                          | 116 and less  | 160 and less  |

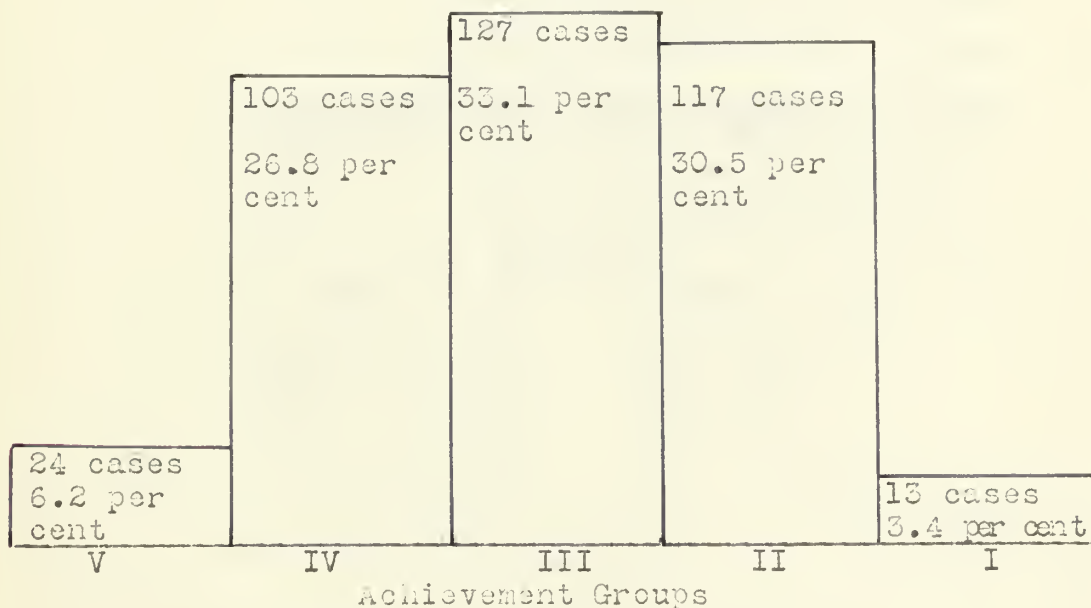


Figure 1. The distribution of pupils in each of the five achievement groups combined for the three-year period of this study.

quency distribution was made of the intelligence quotients. of pupils enrolled during each year. The arithmetic mean and the standard deviation were calculated for each distribution by the method previously described. They



were used to establish the limits of the intelligence-quotient groups. These limits in terms of standard deviations above and below the mean intelligence quotient are shown in Table 3. The grouped frequency distributions of intelligence quotients and the computations of the arithmetic means and the standard deviations from them are shown in Appendices VI, VII, and VIII. The limits

Table 3. The Limits of Each Intelligence-Quotient Group in Terms of Standard Deviation from the Mean Intelligence Quotient

| Intelligence-<br>Quotient<br>Group | Limits of Intelligence-<br>Quotient Groups in Terms<br>of Standard Deviations<br>from the Mean Intelligence<br>Quotient |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| (1)                                | (2)                                                                                                                     |
| I.....                             | +1½ or higher                                                                                                           |
| II.....                            | +½ to +1½                                                                                                               |
| III.....                           | -½ to +½                                                                                                                |
| IV.....                            | -1½ to -½                                                                                                               |
| V.....                             | -1½ or lower                                                                                                            |

of each of the five intelligence-quotient groups in terms of intelligence quotients as obtained from the Otis Classification Test are shown in Table 4. The actual distribution of pupil intelligence quotients in each of the five intelligence-quotient groups combined for the three-year period is shown in Figure 2.

School and course.-- The cases of this study were selected from 188 boys and 201 girls, 13 to 16 years of

2. The second part outlines the specific procedures for recording transactions. It details the steps from initial entry to final review, ensuring that all data is captured correctly and consistently.

3. The third part addresses the challenges associated with data management, such as ensuring data integrity and security. It provides strategies to mitigate these risks and maintain the reliability of the information.

4. The fourth part discusses the role of technology in streamlining the data management process. It highlights how modern software solutions can reduce manual errors and improve efficiency in handling large volumes of data.

5. The fifth part focuses on the importance of regular audits and reviews. It explains how these practices help in identifying discrepancies early and ensuring that the data remains accurate and up-to-date.

6. The sixth part concludes by summarizing the key points discussed and reiterates the commitment to maintaining high standards of data management and transparency.

7. The seventh part provides a detailed overview of the company's data management policies. It includes guidelines for data collection, storage, and distribution, ensuring that all employees are aware of and follow these protocols.

8. The eighth part discusses the legal and regulatory requirements that govern data management. It ensures that the company's practices are compliant with all relevant laws and regulations, minimizing the risk of legal penalties.

9. The ninth part outlines the training and development programs for staff involved in data management. It aims to equip them with the necessary skills and knowledge to perform their duties effectively.

10. The tenth part provides a final summary and expresses the company's dedication to continuous improvement in its data management practices.

Table 4. Limits of Intelligence-Quotient Groups in Terms of Intelligence Quotients as Determined from the Otis Classification Test (revised)

| Intelligence-Quotient Group | Limits in Terms of Intelligence Quotients as Determined from the Otis Classification Tests (revised) |               |               |
|-----------------------------|------------------------------------------------------------------------------------------------------|---------------|---------------|
|                             | School Year                                                                                          |               |               |
|                             | 1946-47                                                                                              | 1947-48       | 1948-49       |
| (1)                         | (2)                                                                                                  | (3)           | (4)           |
| I.....                      | 121 and above                                                                                        | 125 and above | 123 and above |
| II.....                     | 111 to 120                                                                                           | 110 to 124    | 110 to 122    |
| III.....                    | 99 to 110                                                                                            | 95 to 109     | 98 to 109     |
| IV.....                     | 87 to 98                                                                                             | 80 to 94      | 84 to 97      |
| V.....                      | 86 and below                                                                                         | 79 and below  | 83 and below  |

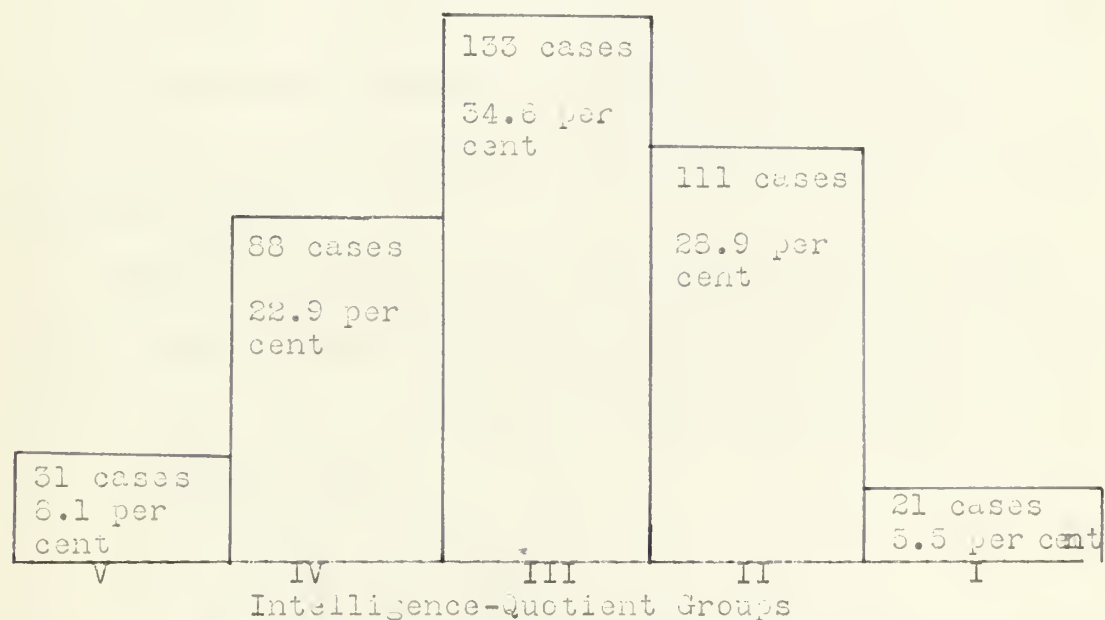


Figure 2. The distribution of pupils in each of the five intelligence-quotient groups combined for the three-year period of this study.

of age. These 384 pupils represent the total three-year enrollment in ninth-grade science upon whom data were available.

The course in ninth-grade science is an elementary

|                                                                                                                                                                                                                 |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>1. The first part of the report is a general introduction to the subject of the study. It discusses the importance of the study and the objectives of the research.</p>                                      |  |
| <p>2. The second part of the report is a detailed description of the methodology used in the study. It includes information about the sample, the data collection methods, and the statistical analysis.</p>    |  |
| <p>3. The third part of the report is a presentation of the results of the study. It includes tables, figures, and text describing the findings.</p>                                                            |  |
| <p>4. The fourth part of the report is a discussion of the results and their implications. It includes a comparison of the results with previous research and a discussion of the limitations of the study.</p> |  |
| <p>5. The fifth part of the report is a conclusion and a list of references. The conclusion summarizes the main findings of the study, and the references list the sources used in the research.</p>            |  |
| <p>6. The sixth part of the report is an appendix containing additional information related to the study, such as raw data, questionnaires, and interview transcripts.</p>                                      |  |
| <p>7. The seventh part of the report is a bibliography listing the sources used in the study.</p>                                                                                                               |  |
| <p>8. The eighth part of the report is a list of abbreviations and a glossary of terms used in the study.</p>                                                                                                   |  |
| <p>9. The ninth part of the report is a list of figures and tables used in the study.</p>                                                                                                                       |  |
| <p>10. The tenth part of the report is a list of references.</p>                                                                                                                                                |  |

survey of the physical sciences. The subject is optional for pupils enrolled in the college curriculum, but it is required for pupils enrolled in the commercial and general courses. During two of the three years covered by this study, the subject was taught by the writer; the third year by a colleague on the present faculty from whom information was readily available.

Although the pupils were homogeneously grouped in nine or ten sections, the course content was the same for each section. The faster-learning groups participated in a more intensive analysis of the various units. The achievement of all the pupils was evaluated by the same objective tests.

Sources of data.-- The cumulative records, life cards, and the record of standardized tests given to the pupils were used to obtain the data listed below.

I. Census data

- A. Chronological age
- B. Sex
- C. Place of birth
- D. Place of previous schooling
- E. Information about immediate family

II. Educational data

- A. Age at beginning of grade one
- B. Pre-grade-one attendance
- C. Age at entrance into grade nine
- D. Absence and tardiness
  - 1. Previous years
  - 2. Grade nine
- E. Grades repeated
- F. Comments of previous teachers
- G. Marks in other subjects





- 1. Previous years
- 2. Grade nine
- H. Pupil load
- I. Course
- J. Conduct
- III. Results of standardized tests
  - A. Otis Classification Test
  - B. Stanford Achievement Tests
  - C. Iowa Tests of Educational Development

Information as to the subjects height, weight, hearing, posture, vision, speech, and other physical defects was obtained from the Commonwealth of Massachusetts, Department of Education, Physical Record Card and from the school nurse.

Evaluation of pupils' personality, adjustment, character, and work habits.-- Evaluations of the pupils' personality, adjustment, character, and work habits were obtained by teachers' ratings of these factors. The rating form used is shown in Figure 3. The majority rating by at least three of the pupils' ninth-grade teachers were used as the values in reporting the pupils' traits.

Methods of obtaining other data.-- Data in regard to pupil health, environment, immediate family, associates, activities, interests, study habits, and school attitudes were obtained from the pupil during a personal interview with the writer by use of the inquiry form shown in Figure 4. The items of this inquiry form were filled in by the writer during the interview. The items of this inquiry form were adapted from the works of seven



Pupil \_\_\_\_\_

Directions: Rate the pupil whose name appears above in the following traits by comparing him with the average traits of pupils of his grade. Comments to explain your choices are desired.

| Traits                                                                                               | Satisfactory | Dissatisfactory | Not Observed | Comment |
|------------------------------------------------------------------------------------------------------|--------------|-----------------|--------------|---------|
| 1. <u>Industry:</u> Is pupil's work steady and of his own accord?                                    |              |                 |              |         |
| 2. <u>Emotional Control:</u> Does pupil show poise, nervous stability, reasoned behavior?            |              |                 |              |         |
| 3. <u>Social Habits:</u> Is pupil respectful of the rights of others, courteous, cooperative?        |              |                 |              |         |
| 4. <u>Accuracy:</u> Is this pupil a regular and reliable observer and worker?                        |              |                 |              |         |
| 5. <u>School Adjustment:</u> Does pupil respect property and regulations? Does he show self-control? |              |                 |              |         |
| 6. <u>Attitudes:</u> Is pupil sincere, cheerful, honest?                                             |              |                 |              |         |
| 7. <u>Initiative:</u> Does pupil start new undertakings? Does pupil face facts and take action?      |              |                 |              |         |
| 8. <u>Leadership:</u> Does pupil lead others? Is he popular with other pupils?                       |              |                 |              |         |
| 9. <u>Group Participation:</u> Is pupil at ease with others?                                         |              |                 |              |         |
| 10. <u>Self-confidence:</u> Has pupil confidence in his own ability and in his own judgement?        |              |                 |              |         |



|                                                                          |  |  |  |  |
|--------------------------------------------------------------------------|--|--|--|--|
| Desire To Excel: Does<br>pupil give evidence of<br>desire for education? |  |  |  |  |
|--------------------------------------------------------------------------|--|--|--|--|

Figure 2. Teacher rating form to determine pupils' personality, adjustment, character, and work habits.

al authors.<sup>1/</sup>

The validity of the pupils' responses to the writer during the interview was estimated in the following manner: The pupil was requiered on every fifth question on the inquiry form - which were arranged in random order - one month or more after the interview. Any discrepancy on these items or any lack of agreement between the report of the pupil and that of his teachers on other items is reported in the individual case histories in the third chapter.

The format of the case studies.-- The arrangement of the data reported for the students was adapted from that described in monograph 13, National Survey of Secondary Education.<sup>2/</sup> The cases are presented in order of increasing intelligence quotients for those whose achieve-

1/ Roy O. Billett, Provisions for Individual Differences, Marking, and Promotions. National Survey of Secondary Education, monograph number 13, Washington, D. C. United States Office of Education, p. 445-461; Beatrice H. Cahill and J. Wendell Yeo, A Student Inventory of Personal Assests and Liabilities. Boston University, Boston, 1941; and Arthur E. Traxler, The Use of Tests and Rating Devices in the Appraisal of Personality. Educational Records Bureau, New York, 1938.

2/ Roy O. Billett, op. cit. p. 406-410.





## Inquiry Form

Pupil \_\_\_\_\_

| Interest or Activity                 | Is Pupil Interested? | Comment |
|--------------------------------------|----------------------|---------|
| 1. Read library books                |                      |         |
| 2. Read newspapers                   |                      |         |
| 3. Read comic books                  |                      |         |
| 4. Play a musical instrument or sing |                      |         |
| 5. Collect things                    |                      |         |
| 6. Make things                       |                      |         |
| 7. Keep a diary or a scrapbook       |                      |         |
| 8. Draw, paint, model, or design     |                      |         |
| 9. Write poems or stories            |                      |         |
| 10. Help at home with the work       |                      |         |
| 11. Garden                           |                      |         |
| 12. Care for a pet                   |                      |         |
| 13. Engage in outdoor sports         |                      |         |
| 14. Belong to the Community House    |                      |         |
| 15. Play games like cards            |                      |         |
| 16. Go to Church or Sunday School    |                      |         |
| 17. Attend parties                   |                      |         |
| 18. Attend dances                    |                      |         |
| 19. Belong to clubs in school        |                      |         |
| 20. Work in a laboratory             |                      |         |
| 21. Do puzzles                       |                      |         |
| 22. Study nature                     |                      |         |



| Interest or Activity           | Is Pupil Interested? | Comment |
|--------------------------------|----------------------|---------|
| 23. Go with boys or girls      |                      |         |
| 24. Belong to scouts           |                      |         |
| 25. Play with older children   |                      |         |
| 26. Play with younger children |                      |         |
| 27. Work                       |                      |         |
| 28. Work after school          |                      |         |
| 29. Fix things                 |                      |         |
| 30. Think about your future    |                      |         |

31. What sicknesses have you had? \_\_\_\_\_
32. What is your father's work? \_\_\_\_\_
33. About how many books are there at home? \_\_\_\_\_
34. Do your parents pay rent or own their home? \_\_\_\_\_
35. How many rooms are there at home? \_\_\_\_\_
36. How many people live at your home? \_\_\_\_\_
37. Do you live with both your parents? \_\_\_\_\_
38. Did either of your parents go to high school or to college? \_\_\_\_\_
39. Do you plan to finish high school? \_\_\_\_\_
40. Do your parents want you to finish high school? \_\_\_\_\_
41. Do you plan to attend any other school when you finish high school? \_\_\_\_\_
42. What do you plan to make your life's work? \_\_\_\_\_
43. What special talents have you? \_\_\_\_\_

| Name             |  | Address            |  | City            |  | State |  | Zip   |  |
|------------------|--|--------------------|--|-----------------|--|-------|--|-------|--|
| Mr. J. H. Smith  |  | 123 Main St.       |  | Springfield     |  | Ill.  |  | 62761 |  |
| Mr. W. R. Jones  |  | 456 Oak Ave.       |  | Chicago         |  | Ill.  |  | 60601 |  |
| Mr. T. L. Brown  |  | 789 Elm St.        |  | Peoria          |  | Ill.  |  | 61601 |  |
| Mr. S. K. White  |  | 101 Maple Dr.      |  | Rockford        |  | Ill.  |  | 61101 |  |
| Mr. D. M. Green  |  | 234 Pine Ln.       |  | Decatur         |  | Ill.  |  | 62521 |  |
| Mr. C. N. Black  |  | 567 Cedar St.      |  | Normal          |  | Ill.  |  | 62551 |  |
| Mr. E. O. Gray   |  | 890 Birch Ave.     |  | Urbana          |  | Ill.  |  | 62501 |  |
| Mr. F. P. Hall   |  | 112 Spruce St.     |  | Macomb          |  | Ill.  |  | 61451 |  |
| Mr. G. Q. Adams  |  | 145 Ash Dr.        |  | Streator        |  | Ill.  |  | 61351 |  |
| Mr. H. R. Baker  |  | 178 Willow Ln.     |  | Lacon           |  | Ill.  |  | 61301 |  |
| Mr. I. S. Clark  |  | 201 Poplar St.     |  | Shelburne       |  | Ill.  |  | 61351 |  |
| Mr. J. T. Evans  |  | 234 Sycamore Ave.  |  | Waukegan        |  | Ill.  |  | 60081 |  |
| Mr. K. U. Fisher |  | 267 Walnut Dr.     |  | Winnetka        |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 290 Chestnut Ln.   |  | Wilmette        |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 323 Elm St.        |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 356 Oak Ave.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. O. Y. King   |  | 389 Elm St.        |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. P. Z. Wright |  | 412 Maple Dr.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Q. A. Scott  |  | 445 Pine Ln.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. R. B. Green  |  | 478 Cedar St.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. S. C. Hall   |  | 501 Birch Ave.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. T. D. Adams  |  | 534 Spruce St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. U. E. Baker  |  | 567 Ash Dr.        |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. V. F. Clark  |  | 590 Willow Ln.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. W. G. Evans  |  | 623 Poplar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. X. H. Fisher |  | 656 Sycamore Ave.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Y. I. Gibson |  | 689 Walnut Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Z. J. Hill   |  | 712 Chestnut Ln.   |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. A. K. Young  |  | 745 Elm St.        |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. B. L. King   |  | 778 Oak Ave.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. C. M. Wright |  | 811 Maple Dr.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. D. N. Scott  |  | 844 Pine Ln.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. E. O. Green  |  | 877 Cedar St.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. F. P. Hall   |  | 910 Birch Ave.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. G. Q. Adams  |  | 943 Spruce St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. H. R. Baker  |  | 976 Ash Dr.        |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. I. S. Clark  |  | 1009 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. J. T. Evans  |  | 1042 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. K. U. Fisher |  | 1075 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 1108 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 1141 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 1174 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. O. Y. King   |  | 1207 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. P. Z. Wright |  | 1240 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Q. A. Scott  |  | 1273 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. R. B. Green  |  | 1306 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. S. C. Hall   |  | 1339 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. T. D. Adams  |  | 1372 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. U. E. Baker  |  | 1405 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. V. F. Clark  |  | 1438 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. W. G. Evans  |  | 1471 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. X. H. Fisher |  | 1504 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Y. I. Gibson |  | 1537 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Z. J. Hill   |  | 1570 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. A. K. Young  |  | 1603 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. B. L. King   |  | 1636 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. C. M. Wright |  | 1669 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. D. N. Scott  |  | 1702 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. E. O. Green  |  | 1735 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. F. P. Hall   |  | 1768 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. G. Q. Adams  |  | 1801 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. H. R. Baker  |  | 1834 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. I. S. Clark  |  | 1867 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. J. T. Evans  |  | 1900 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. K. U. Fisher |  | 1933 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 1966 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 1999 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 2032 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. O. Y. King   |  | 2065 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. P. Z. Wright |  | 2098 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Q. A. Scott  |  | 2131 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. R. B. Green  |  | 2164 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. S. C. Hall   |  | 2197 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. T. D. Adams  |  | 2230 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. U. E. Baker  |  | 2263 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. V. F. Clark  |  | 2296 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. W. G. Evans  |  | 2329 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. X. H. Fisher |  | 2362 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Y. I. Gibson |  | 2395 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Z. J. Hill   |  | 2428 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. A. K. Young  |  | 2461 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. B. L. King   |  | 2494 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. C. M. Wright |  | 2527 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. D. N. Scott  |  | 2560 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. E. O. Green  |  | 2593 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. F. P. Hall   |  | 2626 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. G. Q. Adams  |  | 2659 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. H. R. Baker  |  | 2692 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. I. S. Clark  |  | 2725 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. J. T. Evans  |  | 2758 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. K. U. Fisher |  | 2791 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 2824 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 2857 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 2890 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. O. Y. King   |  | 2923 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. P. Z. Wright |  | 2956 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Q. A. Scott  |  | 2989 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. R. B. Green  |  | 3022 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. S. C. Hall   |  | 3055 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. T. D. Adams  |  | 3088 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. U. E. Baker  |  | 3121 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. V. F. Clark  |  | 3154 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. W. G. Evans  |  | 3187 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. X. H. Fisher |  | 3220 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Y. I. Gibson |  | 3253 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Z. J. Hill   |  | 3286 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. A. K. Young  |  | 3319 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. B. L. King   |  | 3352 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. C. M. Wright |  | 3385 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. D. N. Scott  |  | 3418 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. E. O. Green  |  | 3451 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. F. P. Hall   |  | 3484 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. G. Q. Adams  |  | 3517 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. H. R. Baker  |  | 3550 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. I. S. Clark  |  | 3583 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. J. T. Evans  |  | 3616 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. K. U. Fisher |  | 3649 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 3682 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 3715 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 3748 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. O. Y. King   |  | 3781 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. P. Z. Wright |  | 3814 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Q. A. Scott  |  | 3847 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. R. B. Green  |  | 3880 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. S. C. Hall   |  | 3913 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. T. D. Adams  |  | 3946 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. U. E. Baker  |  | 3979 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. V. F. Clark  |  | 4012 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. W. G. Evans  |  | 4045 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. X. H. Fisher |  | 4078 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Y. I. Gibson |  | 4111 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Z. J. Hill   |  | 4144 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. A. K. Young  |  | 4177 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. B. L. King   |  | 4210 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. C. M. Wright |  | 4243 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. D. N. Scott  |  | 4276 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. E. O. Green  |  | 4309 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. F. P. Hall   |  | 4342 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. G. Q. Adams  |  | 4375 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. H. R. Baker  |  | 4408 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. I. S. Clark  |  | 4441 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. J. T. Evans  |  | 4474 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. K. U. Fisher |  | 4507 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 4540 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 4573 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 4606 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. O. Y. King   |  | 4639 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. P. Z. Wright |  | 4672 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Q. A. Scott  |  | 4705 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. R. B. Green  |  | 4738 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. S. C. Hall   |  | 4771 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. T. D. Adams  |  | 4804 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. U. E. Baker  |  | 4837 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. V. F. Clark  |  | 4870 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. W. G. Evans  |  | 4903 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. X. H. Fisher |  | 4936 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Y. I. Gibson |  | 4969 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. Z. J. Hill   |  | 5002 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. A. K. Young  |  | 5035 Elm St.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. B. L. King   |  | 5068 Oak Ave.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. C. M. Wright |  | 5101 Maple Dr.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. D. N. Scott  |  | 5134 Pine Ln.      |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. E. O. Green  |  | 5167 Cedar St.     |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. F. P. Hall   |  | 5200 Birch Ave.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. G. Q. Adams  |  | 5233 Spruce St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. H. R. Baker  |  | 5266 Ash Dr.       |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. I. S. Clark  |  | 5299 Willow Ln.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. J. T. Evans  |  | 5332 Poplar St.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. K. U. Fisher |  | 5365 Sycamore Ave. |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. L. V. Gibson |  | 5398 Walnut Dr.    |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. M. W. Hill   |  | 5431 Chestnut Ln.  |  | Winthrop Harbor |  | Ill.  |  | 60091 |  |
| Mr. N. X. Young  |  | 5464 Elm St.       |  | Win             |  |       |  |       |  |

44. Did you attend any school or nursery before you entered the first grade?\_\_\_\_\_
45. What two school subjects do you like the best? Why?\_\_\_\_\_  
\_\_\_\_\_
46. What two school subjects do you like the least? Why?\_\_\_\_\_  
\_\_\_\_\_
47. What school subject was the hardest?\_\_\_\_\_
48. What do you think of school?\_\_\_\_\_
49. Have you ever been the president or leader of a club, group, or gang?\_\_\_\_\_
50. Do you keep records of your assignments?\_\_\_\_\_
51. Do you understand what it is that you are to do for homework?\_\_\_\_\_
52. Do you study every day?\_\_\_\_\_
53. Do you use books other than your text-book?\_\_\_\_\_
54. Do you study until your work is done?\_\_\_\_\_
55. Do you take notes while you study?\_\_\_\_\_
56. Do you look up new words in the dictionary?\_\_\_\_\_
57. Do you make up work promptly?\_\_\_\_\_
58. Do you do homework in subjects which you dislike?\_\_\_\_\_
59. Do you review work that you have previously studied?\_\_\_\_\_  
\_\_\_\_\_
60. Do you study with other pupils?\_\_\_\_\_
61. Do you ever study ahead of the assignments?\_\_\_\_\_

Additional Information:\_\_\_\_\_

---

Figure 4. Interview form used by writer to determine facts about pupil's health, environment, associations, activities, interests, plans, study habits, and school attitudes.



ment group is higher than their intelligence-quotient group, and in the order of decreasing intelligence quotient of pupils whose achievement group is lower than their intelligence-quotient group.

Estimation of mental age.-- The mental age of the cases was obtained by obtaining the product of the pupil's intelligence quotient and his adjusted chronological age (in months) and dividing by 100. Chronological age was adjusted according to the following rule of Terman and Merrill:<sup>1/</sup> "

"Up to 13-0 the entire C. A. is counted; beyond 16-0, none of it. The C. A. of a subject who is between the ages of 13-0 and 16-0 is counted as 13-0 plus two-thirds of the additional months he has lived. This means that a true C. A. of 14 is counted as 13-8; a true C. A. of 15 as 14-4; a true C. A. of 16 as 15-0, which is the highest .... used in the computation ...."

Classification of neighborhood and parental occupation.-- The neighborhoods in which the cases lived were classified in one of four groups by the combined judgment of two life-long residents of the town. The neighborhoods were rated as excellent, good, fair, or poor.

The type of employment of the pupils' fathers was classified in three groups; professional, skilled, and unskilled. The professional classification includes the occupations listed under the professional and semi-

<sup>1/</sup> op. cit. p. 68.





professional groups by Kefauver, Holl, and Drake<sup>1/</sup>; the skilled classification includes the occupations listed under the skilled and semi-skilled groups by these authors. Common labor was classified in the unskilled group.

### The Importance and Limitations of this Study

The importance of this study.-- The importance of the knowledge of the differences in an individual for educational guidance is shown by Ross<sup>2/</sup> and by Billett<sup>3/</sup>. Since the knowledge and the use of these factors may be the difference between high achievement and low achievement of pupils, their knowledge would allow for systematically planned school activities to provide for greater educational growth. Billett<sup>4/</sup> states that "any adequate program to provide for individual differences begins with a study of the individual". The challenge to teachers is pointed out by another authority<sup>5/</sup> as follows; "No one

1/ Grayson Kefauver, Victor Holl, and C. Drake, The Secondary-School Population. National Survey of Secondary Education, monograph 17, United States Office of Education, Washington, D. C., 1932, p. 40-48.

2/ C. C. Ross, Measurement In Today's Schools. Prentice-Hall, New York, 1946, p. 439.

3/ Roy O. Billett, Fundamentals of Secondary School Teaching. Houghton Mifflin Company, Boston, 1940, p. 132-133.

4/ Roy O. Billett, Provisions for Individual Differences Marking, and Promotion. National Survey of Secondary Education, monograph 15, United States Office of Education, Washington, 1932, p. 68.

5/ George D. Stoddard, The Meaning of Intelligence. The MacMillan Company, New York, 1943, p. 9.



knows what any child could do if presented with facts and principles in an orderly ascending sequence with full attention to his motivational needs". A discussion by Thorpe<sup>1/</sup> shows that these particular factors have been utilized by teachers, heretofore, largely by chance. Thus, the knowledge of the particular factors associated with high and low achievement at the several levels of intelligence would be the first step in a teacher's program for promoting the maximum educative growth of pupils.

The importance of knowing the factors associated with high achievement in grade-nine science at each of the several levels of mental ability is indicated by the data of the National Survey of Secondary Education<sup>2/</sup> which shows the frequency of use of homogeneous grouping practises in various subject fields; general science ranks third in frequency of use of forty-one secondary-school subjects.

The limitations of this study.-- This thesis concerns itself with a particular course, namely, ninth-grade science. The answers to the questions, stated above under the purposes of this study, should have application to other secondary-school science classes. The results may be of use also - by interpretation - to teachers and supervisors in other secondary-school areas. With reference to the sources of data used in this study:

<sup>1/</sup> Louis P. Thorpe, Child Psychology and Development. The Ronald Press, New York, 1946, p. 365.

<sup>2/</sup> Billett, op. cit. p. 68.



rence to grade-nine science, the results of this study should prove valuable in estimating the probable success of students in this subjects and in reorganizing the objectives, subject matter, methods, and standards in this area.

The reliability and the validity of this study were necessarily limited by the following factors: (1) lack of recent individual Binet-type intelligence testing; (2) lack of testing results of a battery of achievement tests in grade-nine science, preferably including non-verbal sections; (3) inability of the writer to visit the homes of the pupils used as cases for this study in order to obtain a more accurate picture of home conditions and a better knowledge of the child; (4) inability of the writer to observe the pupils in certain situations where responses may have been favorable, for example, observation of study habits; and (5) data was not available on all the pupils enrolled in grade-nine science, because of transfer into the system, loss of school records, or absence from school on days of intelligence testing. Limitations of time and money did not allow for complete physical examinations by a physician or a thorough psychological examination of the personality of each pupil studied.





## CHAPTER II

### A REVIEW OF THE PREVIOUS RESEARCHES OF THE FACTORS ASSOCIATED WITH ACHIEVEMENT

#### The Relation between Intelligence and Achievement

The dependence of achievement on intelligence.--- The relation between achievement and intelligence is shown by studies such as those of Burks, Jensen, and Terman<sup>1/</sup>; Duff<sup>2/</sup>; and Eysench<sup>3/</sup> to be far from perfect. The fact that the correlation is not high indicates that individual achievement is dependent upon factors other than intelligence, or that the means of evaluating intelligence is to some extent inadequate.

The reliability of tests of intelligence.--- Haggerty<sup>4/</sup> has pointed out that a perfect test of intelligence would probably not give a perfect correlation with school success. A more adequate measure of intelligence would undoubtedly show lack of correlation to a more marked degree.

#### The Relation between Abilities and Aptitudes and Achievement

##### Differences in abilities and aptitudes at a given level

1/ B. S. Burks, D. W. Jensen, and L. M. Terman, Genetic Studies of Genius, Volume III, The Promise of Youth. Stanford University Press, Stanford, California, 1930

2/ J. F. Duff, "Children of High Intelligence", British Journal of Psychology (1939) 29:413-439.

3/ H. J. Eysench, "Student Selection by Means of Psychological Tests - A Critical Survey" British Journal of Educational Psychology (1947) 17: 20-39.

4/ M. E. Haggerty, "Measuring Human Capacity" Journal of Educational Research (August, 1921) 3: 246.



of intelligence.-- Tiegs<sup>1/</sup> data revealed that 25 pupils who were identical in intelligence quotient, mental age, or chronological age showed average differences in memory ability, spacial ability, reasoning ability, and language ability of three to five or more years. This author pointed out that children can attain the same intelligence quotients by many different combinations of abilities. Two decades ago, Hull<sup>2/</sup> showed that at a given level of intelligence individual aptitudes differ.

Differences in abilities at a constant mental age.-- Several authors<sup>3/</sup> have noted that of students of similar mental age, but of different chronological age, the older will probably excel the younger at muscular, motor, and routine performances including memory. The younger will excel the older in verbal discrimination and linguistic and numerical performances involving high-level organization. The differences among pupils may be inherited or

1/ Ernest W. Tiegs, Tests and Measurements in the Improvement of Learning. Houghton Mifflin Company, Boston, 1939, p. 270-273.

2/ Clark L. Hull, Aptitude Testing. World Book Company, Yonkers, New York, 1928, p. 36.

3/ See for example (1) M. A. Merrill, "On the Relation of Intelligence to Achievement in the Case of Mentally Retarded Children", Comparative Psychology Monographs, 1924, Number 10; (2) Edward B. Greene, Measurement of Human Behavior. The Odyssey Press, New York, 1941; and (3) L. M. Terman, "Genius and Stupidity, a Study of the Intellectual Processes of Seven 'Bright' and Seven 'Stupid' Boys", Pedagogical Seminary(1906) 13: 307-73.



acquired, congenital or post-natal, physical or mental, or any combination of these factors.<sup>1/</sup>

The relation between intelligence sub-scores and achievement.-- Correlations between marks of college freshman enrolled in a physical-science-survey course and sub-scores on the American Psychological Examination were made by Brewer.<sup>2/</sup> He found correlations between marks and Q scores (sum of the scores on the arithmetic, analogies, and number series parts) and between marks and L scores (sum of the scores on the completion, artificial language, and same-opposite sections) to be 0.18 and 0.22 respectively. The Q and L scores gave a correlation of 0.38 with each other. The total score gave a correlation of 0.26 with marks.

The dependence of intelligence test scores on familiarity with the English language.-- Intelligence tests, such as the Otis Classification Tests, require familiarity with the printed English language. Pupils from homes where a foreign language is spoken or whose familiarity with the English language is less than normal "cannot be

<sup>1/</sup> R. L. Drake, "On Aptitudes and Aptitude Testing", in P. L. Harriman, Encyclopedia of Psychology. Philosophical Library, New York, 1946.

<sup>2/</sup> W. L. Brewer, Factors Affecting Student Achievement and Change in a Physical Science Survey Course. Teachers College Contributions to Education, Number 668, Bureau of Publications, Columbia University, New York, 1946, p. 20.





considered as properly tested".<sup>1/</sup> The amount of allowance to make for language difficulty is not known.<sup>2/</sup>

The relation between educational ability and mental ability.-- The relation between tested mental ability and tested educational ability is given by Otis<sup>3/</sup> as follows:

"....if a pupil is doing as well in his school work as would be expected of a pupil of his degree of mental ability, his EA will be the same as his MA. Similarly, his EQ will equal his IQ.

"If a pupil's EA is greater than his MA, it would appear that he is doing or has done better work than would be expected of a pupil of his degree of mental ability. This may be the result of superior school training, either in the way of method or as the result of stimulation and encouragement on the part of the teacher, or of superior home training either before the pupil entered school or during his school career or both, or of special interest or perseverance on the part of the pupil, or of a special desire to excel in school. It generally happens that a dull pupil who has been promoted beyond his mental ability on account of his age is compelled to work over his mental capacity to keep up with the class.

"If a pupil's EA is less than his MA, it would appear that he is not doing or has not done as good school work as he should for his degree of mental ability. This may be the result of poor school training--either poor methods or indifferent teaching; or of poor home training, such as the hearing of ungrammatical language at home; or of improper methods of study, lack of interest in school work, ill health, indifference, absence from school, laziness, lack of stimulating influences, etc.

"The pupil's EQ will be greater or less than his

1/ Arthur S. Otis, Manual of Directions, Otis Classification Test, World Book Company, Yonkers, New York, 1941 p. 7.

2/ Ibid, p. 7.

3/ Ibid, p. 13-14.



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DEPARTMENT OF CHEMISTRY  
JANUARY 1950

1. The first part of the report describes the experimental work carried out during the past year. The results of the experiments are presented in the form of tables and graphs. The second part of the report discusses the theoretical aspects of the problem. The third part of the report contains a summary of the work and a list of references.

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10. The first part of the report describes the experimental work carried out during the past year. The results of the experiments are presented in the form of tables and graphs. The second part of the report discusses the theoretical aspects of the problem. The third part of the report contains a summary of the work and a list of references.

IQ according as his EA is greater or less than his MA."

### The Relation of School History to Achievement

The effect of previous schooling.-- No studies on the effect of previous schooling on achievement in the secondary school are reported. At the age of 10 years, there is no correlation between achievement and the number of years of school attendance.<sup>1/</sup> Terman<sup>2/</sup> found, in the grades below high school, practically no correlation between the achievement scores of gifted pupils and years spent in school. The evidence at the elementary level is not conclusive as indicated by the review made by Thorpe.<sup>3/</sup>

Brewer<sup>4/</sup> investigated the conditioning factor of high school attendance upon the achievement of college freshman in a physical science survey course. The variations he found were "no greater than might be expected in chance samplings from a homogeneous population". He concluded

1/ Lewis M. Terman and Melita Oden in Intelligence, Its Nature and Nurture. Thirty-Ninth Yearbook of the National Society for the Study of Education, Public School Publishing Company, Bloomington, Illinois, 1940, p. 68. Part I.

2/ Lewis M. Terman, "The Gifted Student and His Academic Environment", School and Society (January 1939) 49: 71.

3/ Louis P. Thorpe, Child Psychology and Development. The Ronald Press, New York, 1946, p. 338-339.

4/ Brewer, op. cit. p. 22-23.



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that "the belief that there are significant differences among the students coming from different high schools is not substantiated". In this same study Brewer determined the effect of enrollment in the various high-school science classes upon achievement. He found that students who had taken physical science courses in high school exhibited higher achievement than those who had taken courses in biological science. The difference was not quite significant according to usual statistical standards. Another comparison revealed that students who had taken more high school science obtained almost the same mean grade as those who had enrolled in fewer high-school science courses.

This same author<sup>1/</sup> found that a positive correlation existed between achievement in physical science survey course and the number of semesters of high-school mathematics taken. Students who had taken six or more semesters of high-school mathematics attained a mean grade point average of 3.1 as compared to a mean grade point average of 2.6 of those who had taken five or fewer semesters.

Less than 13 per cent of the variation in educational age of a group of pupils is due to school training as reported by Heilman.<sup>2/</sup> School standing is a good predictant

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<sup>1/</sup> Loc. cit.

<sup>2/</sup> J. D. Heilman in Intelligence, Its Nature and Nurture. Twenty Seventh Yearbook of the National Society for the Study of Education, Public School Publishing Company, Bloomington, Illinois, 1928, part II, p.35-65.



of college success.<sup>1/</sup>

Previous success in subject.-- The relation between academic success in a given subject area and future success in that area has been summarized by Ross<sup>2/</sup> as follows:

"Abundant experimental evidence supports the conclusion that at all educational levels the best single prediction that can be made of an individual's record in a subject is his past record in that subject or in closely related subjects. 'The best prediction of an individual's future success in a given area is the level of his achievement in that area up to the present.'<sup>3/</sup> Almost without exception, the closest correlation with the second year's record in any high school or college subject is the first year's record in that subject. Generally, the second semester's record can be predicted from the first semester's record in that subject better than from any test of general intelligence or of specific aptitude."

Pre-grade-one schooling.-- Herr<sup>4/</sup> concluded that pre-first grade training is an important factor in success in learning to read among Spanish-American children. In a summary of research in this area Wellman<sup>5/</sup> concludes that

1/ Eysench, op. cit. p. 39.

2/ C. C. Ross, Measurement in Today's Schools. Prentice-Hall, New York, 1946, p. 514.

3/ Giles M. Ruch and David Segel, Minimum Essentials of the Individual Inventory in Guidance. United States Office of Education, Washington, 1939, p.40.

4/ Selma E. Herr, "Effect of Pre-First Grade Training Upon Reading Achievement Among Spanish-American Children ", Journal of Educational Psychology (December 1946) 37: 87-102.

5/ Beth Wellman in Intelligence, Its Nature and Nurture. Twenty Seventh Yearbook of the National Society for the Study of Education, Public School Publishing Company, Bloomington, Illinois, 1928, part I, p. 27.







pre-school attendance covers a complex array of experiences and environmental impacts that may be different from one pre-school setting to another; she cautions against a generalization from the findings in one nursery school until it is determined whether similar results are obtained in other settings.

School attendance.-- Ziegler<sup>1/</sup> studied attendance as a factor in school progress. He found a correlation of 0.27 between attendance and school progress.

Reading ability.-- Fleming<sup>2/</sup> found a correlation between scores on the Haggerty Reading Tests and mean achievement in the junior high school of 0.53. A comparison of reading scores with grades in chemistry and physics made by Krathwohl<sup>3/</sup> shows a clear relationship between the reading ability of college freshman and success in lecture courses in these subjects.

Pupil load.-- The relation between pupil load and

1/ L. Ziegler, "Learning and Forgetting", Journal of Higher Education, (May 1931) 2: 144-146.

2/ Cecilia W. Fleming, A Detailed Analysis of Achievement in High School. Teachers College, Columbia University, Contributions to Education, Number 196, Bureau of Publications, Teachers College, Columbia University, New York, 1925, p. 111.

3/ William C. Krathwohl, "The Importance of Acquiring Reading Skills", National Elementary Principal (February 1946) 25: 30-33.



scholarship has been investigated by Pierson and Nettles.<sup>1/</sup> On the basis of the comparison of two groups of students equated as to intelligence quotients one carrying four "solid" subjects, the other "five", they found no differences or very slight differences in favor of either the four or the five solid groups depending upon the sex of the student and the grade level.

Like of subject and like of school.-- In a study by Monash<sup>2/</sup> boys listed science as one of three most-liked subjects; such was not the case with girls. Dislike of work may be caused by previous failure to receive rewards.<sup>3/</sup> Monash<sup>4/</sup> noted that the greater the pupils' success in school, the greater his liking for it.

The relation of achievement to emotional factors in school.-- Raths<sup>5/</sup> reported studies in which significant progress had been made by pupils when teachers were led to a deeper understanding of pupil needs. Needs identi-

<sup>1/</sup> C. D. Pierson and C. Nettels, "The Scholarship of High School Pupils Taking Five Solids versus Those Taking Four Solids", Educational Research Bulletin (Los Angeles Schools) (October-November 1927) 7: 13.

<sup>2/</sup> L. Monash, "Why Children Like or Dislike School", Understanding the Child, (1947) 11: 67-70.

<sup>3/</sup> M. F. Martin, "Child Psychology", in P. L. Harriman, Encyclopedia of Psychology. Philosophical Library, New York, 1946, p. 65.

<sup>4/</sup> Loc. cit.

<sup>5/</sup> Louis Raths, "Some Recent Researches in Helping Teachers to Understand Children", Journal of Educational Sociology (December 1947) 21: 205-211.



fied include belonging, achievement, economic security, freedom from fear, love and affection, freedom from guilt, personal integrity in sharing, understanding, and knowledge. Fultz<sup>1/</sup> found that an in-service teacher-education program which emphasized human relations tended to result in significant increases in social acceptance, reading skills, and intelligence as measured by psychological tests. It has been noted by Hartzig<sup>2/</sup> that teachers need help in observing children and in interpreting their observations.

Thompson and Hunnicutt<sup>3/</sup> found differences in the reactions to praise and blame between introverts and extroverts. The word output of introverts was increased by repeated praise. Repeated blame increased the output of extroverts more than praise. Potter<sup>4/</sup> had earlier shown a difference in the effectiveness of reproof in relation

1/ A. C. Fultz, "Improving Learning Through An Emphasis on Human Relations in an In-Service Teacher Education Program", in Abstracts of Doctors' Dissertations. The Ohio State University Press, Columbus, 1947, p. 129-140.

2/ Barbara A. Hartzig, The Nature and Scope of Guidance Services in Elementary Schools. The University of Southern California Press, Los Angeles, 1945, p. 179.

3/ G. G. Thompson and C. W. Hunnicutt, "The Effect of Repeated Praise or Blame on the Work Achievement of Introverts and Extroverts", Journal of Educational Psychology (May 1944) 35: 257-266.

4/ Elmer H. Potter, "The Effect of Reproof in Relation to Age in School Children", Pedagogical Seminary and Journal of Genetic Psychology, (December 1943) 63: 247-258.



1. The first part of the paper discusses the importance of the study of the history of the English language. It is argued that a knowledge of the history of the language is essential for a full understanding of the language in its present state. The paper then goes on to discuss the various factors which have influenced the development of the English language, such as the influence of other languages, the influence of the social and political environment, and the influence of the individual writers of the language.

2. The second part of the paper discusses the various stages of the development of the English language. It begins with the Old English period, which is characterized by the use of Old English, and then goes on to discuss the Middle English period, which is characterized by the use of Middle English, and finally the Modern English period, which is characterized by the use of Modern English.

3. The third part of the paper discusses the various factors which have influenced the development of the English language. It begins with the influence of other languages, such as Latin, French, and Greek, and then goes on to discuss the influence of the social and political environment, and finally the influence of the individual writers of the language.

4. The fourth part of the paper discusses the various stages of the development of the English language. It begins with the Old English period, which is characterized by the use of Old English, and then goes on to discuss the Middle English period, which is characterized by the use of Middle English, and finally the Modern English period, which is characterized by the use of Modern English.

5. The fifth part of the paper discusses the various factors which have influenced the development of the English language. It begins with the influence of other languages, such as Latin, French, and Greek, and then goes on to discuss the influence of the social and political environment, and finally the influence of the individual writers of the language.

6. The sixth part of the paper discusses the various stages of the development of the English language. It begins with the Old English period, which is characterized by the use of Old English, and then goes on to discuss the Middle English period, which is characterized by the use of Middle English, and finally the Modern English period, which is characterized by the use of Modern English.

7. The seventh part of the paper discusses the various factors which have influenced the development of the English language. It begins with the influence of other languages, such as Latin, French, and Greek, and then goes on to discuss the influence of the social and political environment, and finally the influence of the individual writers of the language.

8. The eighth part of the paper discusses the various stages of the development of the English language. It begins with the Old English period, which is characterized by the use of Old English, and then goes on to discuss the Middle English period, which is characterized by the use of Middle English, and finally the Modern English period, which is characterized by the use of Modern English.

9. The ninth part of the paper discusses the various factors which have influenced the development of the English language. It begins with the influence of other languages, such as Latin, French, and Greek, and then goes on to discuss the influence of the social and political environment, and finally the influence of the individual writers of the language.

10. The tenth part of the paper discusses the various stages of the development of the English language. It begins with the Old English period, which is characterized by the use of Old English, and then goes on to discuss the Middle English period, which is characterized by the use of Middle English, and finally the Modern English period, which is characterized by the use of Modern English.

to age in school children. A review of the literature on the relation of child development to curriculum practices is given by Boistow.<sup>1/</sup>

Extra-curricular activities.-- Borow<sup>2/</sup> has pointed out that participation in extra-curricular activities and in out-of-school employment adversely affected academic performances of college students.

School attitude.-- Pressey<sup>3/</sup> noted the need for determining habits and temperamental adaptability. He stated that a measure of "school attitudes" must be obtained if success in school is to be foretold. In Hartson's study<sup>4/</sup> a correlation between scholarship and attitude of from 0.45 to 0.53 was found depending upon the sex of the pupils and the school position of the rater. Fleming<sup>5/</sup> reported a correlation between mean achievement in the junior high school and school attitude of 0.74.

1/ William H. Boistow in Review of Educational Research (June 1948) 18: 221.

2/ Henry Borow, "Current Practices in the Prediction of College Performances", Journal of American Association of College Registrars (1946) 22: 14-26.

3/ S. L. Pressey, "An Attempt to Measure the Relative Importance of General Intelligence and Certain Character Traits in Contributing to Success in School", Elementary School Journal (1920) 21: 220-229.

4/ L. D. Hartson, "Further Validation of the Rating Scales Used with Candidates for Admission to Oberlin College", School and Society (July 1937) 46: 155-160.

5/ Fleming, loc. cit.





The relation between success in physical education of high school freshman girls and attitudes was investigated by Carr.<sup>1/</sup> This author, using an attitude rating scale, reported that attitudes held by entering freshman girls in the high school influence success in physical education.

#### The Relation Between Achievement and Census Data

Sex.-- Brewer<sup>2/</sup> found that men, even though of slightly lower general intelligence, were more successful than women in a college freshman survey course of the physical sciences. On the other hand, Quaid<sup>3/</sup> has noted a tendency for girls to exceed expectation more often than boys and for boys to fall behind expectation more often than girls.

Chronological age.-- Fleming's study<sup>4/</sup> shows a correlation between mean achievement in the junior high school and chronological age of -0.29. A correlation between chronological age and scholarship of from -0.55 to -0.48

1/ M. G. Carr, "The Relationship Between Success in Physical Education and Selected Attitudes Expressed By High School Freshman Girls", Research Quarterly American Association of Health and Physical Educators (1945) 16: 176-191.

2/ Brewer, op. cit. p. 24.

3/ T. D. Quaid, "A Study In the Prediction of College Freshman Marks", Journal of Experimental Education (March 1938) 6: 350-375.

4/ Fleming, op. cit. p. 68-69.

4. The fourth part of the document discusses the implications of the findings. It suggests that the results have significant implications for the field of study and may lead to further research in this area.

5. The fifth part of the document concludes the study. It summarizes the main findings and provides a final statement on the importance of the research.

for 5,738 seniors in six high schools which were located in six states has been reported by Maller.<sup>1/</sup>

#### The Relation of Achievement to Health and Physical Defects

Achievement and physical defects.-- One author has emphasized the relation of achievement to health and physical defects. He pointed out the "....need for removing physical defects and handicaps of pupils before expecting an optimal educative growth and development either physical or mental".<sup>2/</sup> Nearly two decades ago Thorndike<sup>3/</sup> stressed the need for determining health factors in psychological rating. Gates<sup>4/</sup> concluded that physical fitness appears to have greater specific influence upon achievement than does either social or emotional maturity or both combined. Fleming<sup>5/</sup> found a correlation between health as rated by teachers and achievement in senior high school of 0.36. A reliable greater frequency of physical defects

<sup>1/</sup> J. B. Maller, "Age Versus Intelligence as Basis for Prediction of Success in High School", Teachers College Record, (February 1932) 33: 402-415.

<sup>2/</sup> Roy O. Billett, Fundamentals of Secondary School Teaching. Houghton Mifflin Company, Boston, 1940, p. 82.

<sup>3/</sup> Edward L. Thorndike, "A Constant Error in Psychological Ratings", Journal of Applied Psychology (1920) 4: 25-29.

<sup>4/</sup> A. I. Gates, "The Nature and Emotional Significance of Physical Status and of Mental, Physiological, Social, and Emotional Maturity", Journal of Educational Psychology (September 1924) 15: 329-358.

<sup>5/</sup> Fleming, op. cit. p. 111.



and chronic illnesses among 1000 children who were failing as compared with 500 successful pupils is reported by Eames.<sup>1/</sup> Lee and Nemzek<sup>2/</sup> by comparison of groups equated as to intelligence, age-grade location, and occupation of parents found that better marks were secured by a group free of physical defects than by a group characterized by such defects. In a comparison of the highest and lowest quarters in achievement, Cuff<sup>3/</sup> found 36 per cent more of those in the highest quarter have dental work done. Of ten body mechanics rated by teachers on a group of high achievers paires as to chronological age, mental age, intelligence quotient, and sex with a group of low achievers, Bartell<sup>4/</sup> reported a significant difference in favor of the high achievers on auditory alertness only. She states that the differences in ratings on other factors seems

"....to indicate that there was a tendency for teachers to rate the high achievers higher on visual acuteness, concentration of attention, strength, vi-

1/ T. H. Eames, "The Relation of Undiscovered or Disregarded Physical Handicaps to Learning", Elementary School Journal (1945) 45: 516-519.

2/ Frank H. Lee and C. L. Nemzek, "Relation Between Certain Physical Defects and School Achievement", Journal of Social Psychology (1941) 13: 385-394.

3/ W. B. Cuff, "The Vectors of Socio-Economic Status", Peabody Journal of Education (1934) 12: 114-117.

4/ M. E. Bartell, Differences in Social Habits Body Mechanics, and Interests of High and Low Achievers. Unpublished Thesis, Boston University School of Education, Boston, 1942, p. 31-32.





talities, energy and ambition, skill in writing, graceful and efficient motions, and emotional control. The low achievers were rated higher than the high achievers in articulation of speech and in cleanliness of body and clothes. There were no differences in the per cents rated on personal appearance and attractiveness."<sup>1/</sup>

Of various health factors rated by a physician, Bartell's data<sup>2/</sup> shows a greater incidence of glandular defects for low achievers than for high achievers. High achievers, however, had a greater incidence of diseases. High achievers averaged 6.3 pounds heavier and 0.65 feet taller than the low achievers. No evidence of permanent detrimental effects on school success due to illness could be found among pupils.

Biochemical correlates of achievement.-- Martin<sup>3/</sup> notes the need for research devoted to the effects of biochemical conditions, such as poor nutrition and bad air, on scholarship. He suggests that these conditions may be the underlying causes for poor scholarship of the children of the poor. Investigators have found improvements in school work as a result of school health programs.<sup>4/</sup>

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<sup>1/</sup> Loc. cit.

<sup>2/</sup> Ibid, p. 47.

<sup>3/</sup> B. Martin, "Child Psychology" in P. L. Harriman, Encyclopedia of Psychology. Philosophical Library, New York, 1946, p. 64.

<sup>4/</sup> M. C. Hardy, "Improvement in Educational Achievement Accompanying A Health Education Program", Journal of Educational Research 30: 110-123.

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Such improvement was due to greater energy, interest, and wide-awakedness.

#### The Relation Between Achievement and Personal Traits

Individual traits.-- The relation between achievement and personal traits has been the subject of many investigations. Thorpe<sup>1/</sup> pointed out that test intelligence alone is not enough to secure success; "such strictly personal qualities as drive, perserverance, emotional stability, and social intelligence are essential factors in successful achievement". Conklin<sup>2/</sup> postulates that failure of superior pupils in high school may be due to unanalyzed traits of personality. Galton<sup>3/</sup> indicates that a high intelligence quotient must be supplemented by zeal and hard work to produce works of genius. The data of Terman and Oden<sup>4/</sup> has led them to conclude that above an intelligence quotient of 140, adult success is largely determined by such factors as social adjustment, emotional stability, and drive to accomplish. Questionnaire means of measuring

1/ Op. cit. p. 390.

2/ A. M. Conklin, Failure of Highly Intelligent Pupils, A Study of Behavior by Means of a Control Group. Teachers College Contributions To Education, Bureau of Publications, Teachers College, Columbia University, New York, 1932, p. 32.

3/ F. Galton, Hereditary Genius. Macmillan Company, New York, 1914, p. 379.

4/ Op. cit. p. 84.



personality have little prognostic value; however, neurotism estimated by the Rorschach test appears related to achievement.<sup>1/</sup> Though significant differences are lacking, Griffith<sup>2/</sup> found some evidence of a positive correlation between school achievement and personality characteristics.

Basing his conclusions on teachers' ratings of traits Terman<sup>3/</sup> concluded that the discrepancy in superior school work was ordinarily due either to exceptional application on the part of the child or to the effect of vivacity, responsiveness, or other favorable personality traits influencing the teachers judgement. He also concluded that discrepancies in inferior work resulted from several causes including timidity, lack of self-confidence, psychopathic heredity, home spoiling, and love affairs. Pressey<sup>4/</sup> found that industry, application, and co-operation had a correlation of 0.43 with achievement. Haggerty's study<sup>5/</sup> of 50 successful men showed that the common qualities which

1/ Eysench, loc. cit.

2/ G. R. Griffith, "The Relationship Between Scholastic Achievement and Personality Adjustment of Men College Students", Journal of Applied Psychology (1945) 29: 360-367.

3/ L. M. Terman, The Intelligence of School Children. Houghton Mifflin Company, Boston, 1919, p. 68.

4/ Loc. cit.

5/ Op. cit. p. 24.



2. The second part of the document focuses on the implementation of the proposed changes. It details the steps involved in the rollout process, from initial planning to final execution. This section also addresses potential challenges and provides strategies to overcome them, ensuring a smooth transition for all stakeholders.

3. The third part of the document discusses the long-term impact of the changes. It highlights the expected benefits, such as improved efficiency and cost savings, and provides a timeline for when these benefits are anticipated to be realized. This section also includes a summary of the key findings and recommendations for future work.

4. The final part of the document is a conclusion that summarizes the main points of the report. It reiterates the importance of the changes and expresses confidence in the organization's ability to successfully implement them. This section also includes a list of references and a glossary of terms used throughout the document.

they possessed to the greatest degree ranked as follows:

(1) industry, thorough, persistence, painstaking; (2) efficiency; and (3) attentiveness.

Fleming<sup>1/</sup> found low correlations between teachers' ratings of traits and achievement. The correlations between the various traits and achievement are as follows:

|                               |      |
|-------------------------------|------|
| Industry                      | 0.25 |
| Emotional balance             | 0.31 |
| Will and persistence          | 0.10 |
| Prudence and fore-<br>thought | 0.22 |
| Conscientiousness             | 0.36 |
| Desire to excel               | 0.37 |

Adam's study<sup>2/</sup> of personality as revealed by mental test scores of 96 college students showed the following correlations of personality factors with achievement:

|                     |       |
|---------------------|-------|
| Steady worker       | 0.98  |
| Strength of will    | 0.82  |
| Calm in emergency   | 0.71  |
| Conscientiousness   | 0.71  |
| Self-confidence     | 0.66  |
| Reads much          | 0.62  |
| Absent minded       | -0.29 |
| Lacks companionship | -0.33 |
| Gives up easily     | -0.72 |
| Easily persuaded    | -0.73 |
| Joyful              | -0.77 |

Bartell<sup>3/</sup> concluded that industry, initiative, and independence as rated by teachers for pupils paired for

<sup>1/</sup> Op cit. p. 68.

<sup>2/</sup> H. F. Adams, "Personality as Revealed by Mental Test Scores and by Scholastic grades", Journal of Applied Psychology (1928) 12: 261-277.

<sup>3/</sup> Op cit. p. 29.

4. The fourth part of the document discusses the implications of the findings and the limitations of the study. It suggests that the results may have broader applications in other areas of research and that further studies are needed to confirm the findings.

5. The fifth part of the document provides a conclusion and a summary of the key points. It reiterates the importance of accurate record-keeping and the need for ongoing research in this field.

chronological age, mental age, intelligence quotient and sex were significant individual social habits of the high achievers in school. She also states,<sup>1/</sup>

"....though the differences are not significant, they seem to indicate that the teachers tend to rate the high achievers higher than the low achievers on reliability, persistence, promptness, judgement, resourcefulness, creativeness, respect for property, and self-control. There were no differences in the per cents of high and low achievers rated on orderliness and co-operation."

In a study of ten gifted children whose school progress was unsatisfactory, Van Alstyne<sup>2/</sup> reported the main differences to be laziness, shyness, day dreaming, indifference, sensitiveness to criticism, and hypochondriacal fears.

Group social habits.-- Though the differences are not significant Bartell<sup>3/</sup> reports that

"....teachers tended to rate high achievers higher on leadership and general quickness. There were no differences in the per cents rated on courtesy and modesty. There was only a slight difference in favor of the high achievers in the per cents rated on generosity, tolerance, appreciation of work well done by others, friendliness, helpfulness, sincerity, honesty, acceptance of leadership, correct use of language, and ability to adjust to new situations."

<sup>1/</sup> Bartell, op. cit. p. 30-31.

<sup>2/</sup> Dorothy Van Alstyne, A Study of Ten Gifted Children Whose School Progress Was Unsatisfactory. Contributions to Education, Bureau of Publications, Teachers College, Columbia University, New York, 1923, p. 67.

<sup>3/</sup> Loc cit.

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LECTURE 1

LECTURE 2

LECTURE 3

Fleming<sup>1/</sup> noted a correlation of 0.51 between leadership and achievement. Hartson<sup>2/</sup> reported a correlation of between 0.23 and 0.36 between leadership and high school scholarship depending upon the sex of the pupils and the school position of the raters.

#### The Relation Between Achievement and Motivation

The importance of motivation.-- The views of psychologists and educators are in complete accord concerning the relation of motivation to school achievement. A part of the following review of the researches in this area has been adapted from that of Ross.<sup>3/</sup>

Book<sup>4/</sup> asserts that "motivation is the central factor in every learning process". Turney<sup>5/</sup> in his study of high school pupils concluded that the two major factors in school achievement are intelligence and motivation, and that the latter is the more important. Thorndike<sup>6/</sup> stated

1/ Op. cit. p. 190.

2/ Loc. cit.

3/ Op. cit. p. 331-333.

4/ William F. Book, Economy and Technique of Learning. D. C. Heath and Company, New York, 1932, p. 311.

5/ A. H. Turney, "Intelligence, Motivation, and Achievement, Journal of Educational Psychology (September 1931) 22: 133-134.

6/ Edward L. Thorndike and others, The Psychology of "Interests, and Attitudes. D. Appleton-Century Company, Inc., New York, 1933, p. 4.



4. The fourth part of the document discusses the implications of the findings. It suggests that the results have significant implications for the field of study and may lead to further research in this area.

5. The fifth part of the document concludes the study. It summarizes the main findings and provides a final statement on the importance of the research.

"Thought and action occur largely in the service of wants, interests, and attitudes and are stimulated and guided by them." Einstein<sup>1/</sup> has expressed his views as follows, "But behind every achievement exists the motivation which is at the foundation of it...."

Vocational and educational motives are factors which determine academic performance.<sup>2/</sup> Weber<sup>3/</sup> has noted that drives may be modified by factors such as success or failure with previous goals, estimate of his own capacities, and attainability of the goal. Strang<sup>4/</sup> and Ross<sup>5/</sup> rank purpose, after intelligence and previous educational success, as the third most important factor which determined scholastic achievement.

Measurement of motivation.-- Ross<sup>6/</sup> pointed out that no convenient method has been devised for measuring human

1/ Albert Einstein, "Some Thoughts Concerning Education", School and Society (November 1936) 44: 590.

2/ Borow, op. cit. p. 14-26.

3/ C. O. Weber, "Levels of Aspiration", in P. L. Harriman, Encyclopedia of Psychology, Philosophical Library, New York, 1946, p. 45.

4/ Ruth Strang, Personal Development and Guidance in College and Secondary Schools. Harper and Brothers, New York, 1934, p. 72-133.

5/ Ross, op. cit. p. 332-333.

6/ Ibid.

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motives. He further states that "the measurement of motives in education is, then, a problem for the future".

### The Relation of Achievement to Interests

Achievement and interests.-- Interest inventories appear to be a promising indicator of college success.<sup>1/</sup> The hypothesis that interests may correlate significantly with achievement over a long period of time was tested by Frandsen.<sup>2/</sup> This author concluded that the hypothesis is upheld in regard to interest and endeavor in science. He also pointed out that interest in a given field results in frequent pupil choice of courses in that area.

Interest is at all times the motivating factor in the learning process.<sup>3/</sup> Frandsen<sup>4/</sup> has noted that successful persons in "functional groups exhibit characteristic interest patterns". The relation between interest and success is greatly strengthened if the interest is of long standing.<sup>5/</sup>

1/ Op. cit. p. 38.

2/ Arden Frandsen, Interests and General Educational Development", Journal of Applied Psychology (1947) 31: 57-66.

3/ Ross, op. cit. p. 469.

4/ Loc. cit.

5/ James L. Mursell, Psychological Testing. Longmans, Green and Company, 1947, p. 254.



The interests of high and low achievers.-- Blair<sup>1/</sup> summarized studies on interest and found that high school pupils of low intelligence quotients have different interests from that of pupils with high intelligence quotients in many fields. These studies have shown that superior children have greater interest in reading novels, history, and science; playing musical instruments; and in collecting. Retarded pupils have a greater interest in work.

With pupils paired as to chronological age, mental age, and intelligence quotient, Bartell<sup>2/</sup> reported interest in current news, caring for pets, and gangster activities as significant characteristics of high achievers. She also found that interest in voluntary reading, mental activity, and creative writing showed differences that were close to being significant for high achievers. Though the differences are not significant, she found that teachers tended to rate high achievers higher on the following interests: radio-technical, motion pictures, radio programs, clubs, dramatization, composing music, domestic work, earning money, navigation, sports, drawing, and handicrafts. Low achievers were rated higher than the

<sup>1/</sup> G. M. Blair, Mentally Superior and Inferior Children in the Junior and Senior High School; A Comparative Summary of Their Backgrounds, Interests, and Ambitions. Contributions to Education, Bureau of Publications, Columbia University, New York, 1933, p. 37.

<sup>2/</sup> Op. cit. p. 32-34.





high achievers in interest in aviation, war activities, church, nature, and rhythm. There were no differences in the per cents rated on interests in construction and gardening.

### The Relation Between Achievement and Environment

The socio-economic environment of high and low achievers.-- Cuff<sup>1/</sup> reported that among college freshman when high achievers (top 25 per cent) were compared with low achievers (lowest 25 per cent) 32 per cent more owned an automobile, 20 per cent more had books in the home, and 20 per cent more belong to dues-paying organizations. Engle's investigation<sup>2/</sup> on the basis of average marks for one semester indicate that the underprivileged group falls below the random group, and that the random group falls below the privileged group in all subjects.

Other environmental influences.-- Environmental influence appears to be least on physical characteristics, somewhat greater on mental and educational characteristics, and considerably greater on personality.<sup>3/</sup> Most psycho-

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<sup>1/</sup> Loc. cit.

<sup>2/</sup> T. L. Engle, "Home Environments and School Records", School Review (1934) 42: 590-598.

<sup>3/</sup> H. Newman, F. Freeman, and K. Holzinger, Twins, A Study of Heredity and Environment. University of Chicago Press, Chicago, 1937, p. 332-333.



logists are in general agreement that environment has great affect on personality,<sup>1/</sup> and in this way may be related to school progress.

Pupils' associates and achievement.-- Wellman<sup>2/</sup> postulates that the height of the goal of achievement which children set for themselves is in part determined by the groups with which they associate.

1/ See for example (1) Robert S. and Helen Lynd, *Middletown In Transition*. Harcourt Brace and Company, New York, 1937, p. 7; (2) Lois D. Murphy, *Social Behavior and Child Psychology*. Columbia University Press, New York, 1937, p. 876, 883; and (3) Henry A. Murray, *Explorations in Personality*. Oxford University Press, New York, 1938, p. 39.

2/ Op. cit. 39.



# CHAPTER III

## INDIVIDUAL CASE HISTORIES

Contents of this chapter.-- This chapter consists of the case histories of the 36 children, who make up the two groups of cases. The school year, intelligence quotient, the sum of the numerical test scores for the first half-year, intelligence-quotient group, and achievement group of the cases of this study are given in Table 5 in the order in which the cases are presented. Chapter IV contains tables of the characteristics associated with the pupils in each group. A comparative summary of the characteristics of each group is given in Chapter V.

Table 5. School year, Intelligence Quotient, Aggregate Numerical Achievement, Intelligence-Quotient Group, and Achievement Group of the Cases of This Study.

| Pupil                                                                                                                                 | School Year | Intelligence Quotient | Aggregate Numerical Achievement | Intelligence Quotient Group | Achievement Group |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|---------------------------------|-----------------------------|-------------------|
| (1)                                                                                                                                   | (2)         | (3)                   | (4)                             | (5)                         | (6)               |
| Pupils Whose Marks Place Them In An Achievement Group At Least Two Standard Deviations Higher Than Their Intelligence-Quotient Groups |             |                       |                                 |                             |                   |
| 1...                                                                                                                                  | 48-49       | 68                    | 220                             | V                           | III               |
| 2...                                                                                                                                  | 47-48       | 76                    | 172                             | V                           | III               |
| 3...                                                                                                                                  | 48-49       | 77                    | 257                             | V                           | III               |
| 4...                                                                                                                                  | 48-49       | 79                    | 225                             | V                           | III               |
| 5...                                                                                                                                  | 46-47       | 80                    | 155                             | V                           | III               |
| 6...                                                                                                                                  | 48-49       | 83                    | 256                             | V                           | III               |
| 7...                                                                                                                                  | 46-47       | 84                    | 152                             | V                           | III               |
| 8...                                                                                                                                  | 47-48       | 85                    | 212                             | IV                          | II                |
| 9...                                                                                                                                  | 47-48       | 86                    | 225                             | IV                          | II                |
| 10...                                                                                                                                 | 47-48       | 86                    | 231                             | IV                          | II                |





Table 3. (concluded)

| Pupil                                                                                                                                             | School Year | Intelligence Quotient | Aggregate Numerical Achievement | Intelligence Quotient Group | Achievement Group |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|---------------------------------|-----------------------------|-------------------|
| (1)                                                                                                                                               | (2)         | (3)                   | (4)                             | (5)                         | (6)               |
| Pupils Whose Marks Place Them In An Achievement Group At Least Two Standard Deviations Higher Than Their Intelligence-Quotient Groups (concluded) |             |                       |                                 |                             |                   |
| 11..                                                                                                                                              | 46-47       | 87                    | 180                             | IV                          | II                |
| 12..                                                                                                                                              | 47-48       | 92                    | 209                             | IV                          | II                |
| 13..                                                                                                                                              | 47-48       | 93                    | 212                             | IV                          | II                |
| 14..                                                                                                                                              | 47-48       | 93                    | 246                             | IV                          | II                |
| 15..                                                                                                                                              | 46-47       | 97                    | 194                             | IV                          | II                |
| 16..                                                                                                                                              | 48-49       | 97                    | 237                             | IV                          | II                |
| 17..                                                                                                                                              | 46-47       | 109                   | 254                             | III                         | I                 |
| Pupils Whose Marks Place Them In An Achievement Group At Least Two Standard Deviations Lower Than Their Intelligence-Quotient Groups              |             |                       |                                 |                             |                   |
| A...                                                                                                                                              | 48-49       | 125                   | 260                             | I                           | III               |
| B...                                                                                                                                              | 48-49       | 123                   | 263                             | I                           | III               |
| C...                                                                                                                                              | 46-47       | 122                   | 173                             | II                          | IV                |
| D...                                                                                                                                              | 46-47       | 119                   | 88                              | II                          | IV                |
| E...                                                                                                                                              | 48-49       | 115                   | 215                             | II                          | IV                |
| F...                                                                                                                                              | 47-48       | 115                   | 153                             | II                          | IV                |
| G...                                                                                                                                              | 47-48       | 114                   | 134                             | II                          | IV                |
| H...                                                                                                                                              | 47-48       | 111                   | 151                             | II                          | IV                |
| I...                                                                                                                                              | 46-47       | 111                   | 118                             | II                          | IV                |
| J...                                                                                                                                              | 47-48       | 111                   | 157                             | II                          | IV                |
| K...                                                                                                                                              | 47-48       | 111                   | 156                             | II                          | IV                |
| L...                                                                                                                                              | 46-47       | 111                   | 121                             | II                          | IV                |
| M...                                                                                                                                              | 47-48       | 110                   | 160                             | II                          | IV                |
| N...                                                                                                                                              | 47-48       | 108                   | 109                             | III                         | V                 |
| O...                                                                                                                                              | 48-49       | 106                   | 153                             | III                         | V                 |
| P...                                                                                                                                              | 46-47       | 101                   | 88                              | III                         | V                 |
| Q...                                                                                                                                              | 46-47       | 101                   | 88                              | III                         | V                 |
| R...                                                                                                                                              | 47-48       | 98                    | 3                               | III                         | V                 |
| S...                                                                                                                                              | 47-48       | 96                    | 113                             | III                         | V                 |

## Case 1

An intelligence quotient of 68 classifies case 1 in intelligence-quotient group V. An aggregate numerical score of 220 places him in achievement group III.



This pupil is enrolled in the general course.

Census data.-- Case 1 is a boy who entered the ninth grade at the age of 15 years and 10 months. He was born in a neighboring town, but he received his schooling in the town where he now lives.

Health and physical data.-- Pupil is 62½ inches tall and weighs 113½ pounds. He possesses a slight lateral curvature of the spine. His hearing, vision, speech, and teeth are free from defects. He has had only the usual childhood diseases. He is above average in personal neatness.

Immediate family.-- Both of pupil's parents were born in the United States. His father is dead, and his mother is working as a clerical employee. His mother had some college training, but his father was not graduated from high school. He has two siblings.

Mental data.-- At the time he began grade nine, the following mental data was available on this pupil: mental age of 10 years and 2 months; educational quotient of 70; and a classification index of 69.

Educational history.-- Pupil does not think well of school. His junior high school record bears the notation that he was bored with school activities. His favorite subjects were mathematics and science, because "I understand them". History and English were the sub-



jects he has most disliked, because they are "ancient and hard to do." History has been his most difficult subject. Pupil worries about his ability to pass school work.

Pupil attended nursery school prior to his entrance into the first grade at the age of 5 years and 11 months. He repeated grades two and three. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions only during the fourth grade. He rarely has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                                |    |
|--------------------------------|----|
| Social Science Background      | 0  |
| Natural Science Background     | 37 |
| Correctness in Writing         | 9  |
| Quantitative Thinking          | 2  |
| Reading Social Science         | 7  |
| Reading Natural Science        | 49 |
| Reading Literature             | 16 |
| General Vocabulary             | 20 |
| Uses of Sources of Information | 6  |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 6.4 in reading, 5.3 in language 5.8 in spelling, and 7.2 in arithmetic.

While in junior high school, his teachers felt that he worked close to the limit of his ability. His work was above average in neatness and completeness. His science marks were C- in grade seven and D in grade eight.

The average marks for the first half-year obtained





by him in his other grade-nine subjects were as follows: B in shop and physical education; C in mathematics; and C- in English and history. His attendance in the ninth grade has been excellent. He carried a load of 20 diploma credits in grade nine.

Study habits.-- Pupil keeps a written record of his homework assignments; however, he does not always understand what it is that he is to do. He studies regularly, sometimes with his brother, makes use of other books and a dictionary, and makes notations of facts that he wishes to remember. He states that he reviews work previously studied. Although he does homework in subjects that he dislikes, he studies ahead of his assignments only in mathematics.

Behavior characteristics.-- This pupil is courteous and pleasant. His junior-high-school teachers rated him as above average on the following social habits: ability to get along with others, courtesy, acceptance of responsibility, and observance of school rules. His conduct in grade nine was excellent.

He was rated by his ninth-grade teachers as satisfactory in the following traits: industry, emotional control, social habits, school adjustment, attitudes, initiative, leadership, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in



accuracy.

Environment.-- His family owns a six-room house in a poor neighborhood, which is occupied by seven persons. About 200 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil does some reading of library books and newspapers. He plays a musical instrument, collects cameras and belongs to the school photography club, draws, does carpentry and electrical repairs, and keeps a scrapbook. He helps around the house, with the garden, and with the pets. He attends church, the community house, parties and dances. He was a boy scout. Pupil engages in most outdoor sports, games and puzzle solving. He does not work after school.

Pupils associates.-- This pupil plays with both older and younger children of both sexes. He has never been a leader of a group.

Future plans.-- He plans to complete his high school education and is encouraged in this by his mother. He hopes to be able to attend the United States Naval Academy for further training.

## Case 2.

Case 2 is classified in intelligence-quotient group V, because she has an intelligence quotient of 76. This pupil has a total numerical achievement of 172 and is



classified in achievement group III. She is enrolled in the commercial course.

Census data.-- This girl entered the ninth grade at the age of 15 years and 2 months. She was born and went to school in this town.

Health and physical data.-- This pupil is 65 inches tall and weighs 104½ pounds. She has slight defects of posture, hearing, skin, and feet; and moderate defects of her teeth and glands. She has no visual defects and is average in personal neatness. She has had only the usual childhood diseases.

Immediate family.-- Her parents were born in Italy and are alive. They have not received a high school education. Her father is employed as a blacksmith; her mother is at home. She has five siblings.

Mental data.-- At the time she entered grade nine, the following mental data was available on this pupil: mental age 10 years and 11 months, educational quotient of 88, and a classification index of 82.

Educational history.-- Pupil has liked school. Her favorite subjects are geography and history, because "they were interesting". She has most disliked mathematics and science. English was her most-difficult subject. She does not worry about her school marks.

Pupil began her schooling at the age of 5 years





and 2 months in grade one. She has repeated grades one and five. The attendance records show that she was absent for 10 per cent or more of the scheduled school sessions during the first, fifth, and seventh grades. She seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                                |    |
|--------------------------------|----|
| Social Science Background      | 4  |
| Natural Science Background     | 43 |
| Correctness in Writing         | 13 |
| Quantitative Thinking          | 3  |
| Reading Social Science         | 11 |
| Reading Natural Science        | 3  |
| Reading Literature             | 5  |
| General Vocabulary             | 8  |
| Uses of Sources of Information | 13 |

Her grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 6.6 in reading, 7.0 in language usage, 9.6 in spelling, and 7.7 in arithmetic.

Her junior-high-school teachers noted that she had good school attitudes, and that she was doing the best work of which she was capable. Her science marks were C in grade seven and C- in grade eight.

The average marks for the first-half year which she obtained in other grade-nine subjects were A in geography; B in physical education; C in history, and C- in English and junior business training. She dropped clothing after the start of the school year. She carried a load of 20 diploma credits in grade nine.



Study habits.-- She regularly makes notations of her assignments and understands what she is to do. She studies regularly by herself until her assignments are complete, makes use of reference books, and makes notations of facts to remember. She does homework in subjects which she dislikes and promptly makes up work missed due to absence. Although she reviews studies previously covered, she does not read ahead of her assignments.

Behavior characteristics.-- This girl is very quiet, at times, even moody and pouty; she is fearful of authority. She was rated as satisfactory in the following traits by her grade-nine teachers; social habits, school adjustment, and attitudes. She was rated as unsatisfactory in industry, emotional control, accuracy, initiative, leadership, group participation, self-confidence, and desire to excel.

Environment.-- Her family owns an eight-room house in a poor section of town which is occupied by nine persons. About 20 books are possessed by the family. Italian is spoken at home.

Interests and leisure activities.-- Pupil's outside reading is confined to newspapers and comic books. She spends considerable time after school doing the housework at home. She also helps with the garden and with the family pets. She engages in outdoor sports, goes to



parties and dances, and attends church. She has no interests in puzzle solving, nature study, indoor games, music, art, or making things.

Pupil's associates.-- She associates with girls who are older than herself. She is shy in the presence of boys and will be with them only in the presence of other girls. She has never been a leader of a group.

Future plans.-- Although she has thought about her future, she has been unable to make any decisions. She desires to complete her high school education and is encouraged in this by her parents.

### Case 3

Case 3 has an intelligence quotient of 77 which classifies him in intelligence-group V. His aggregate numerical achievement of 257 places his achievement in achievement group III. This pupil is enrolled in the general course.

Census data.-- Case 3 is a boy whose age on entrance into grade nine was 15 years and 9 months. He was born and spent his entire childhood in this town.

Health and physical data.-- Pupil is 65 inches tall and weighs 125 pounds. He is well developed physically. Hearing, vision, speech, teeth, and posture are free from defects. He has had the usual childhood diseases. The boy is above-average in cleanliness and neatness.





Immediate family.-- Both parents were born in Canada and are alive. His father is a carpenter; his mother is at home. Neither parent has been graduated from high school. He has three siblings.

Mental data.-- At the time of his entrance into the ninth grade the following mental data was available on this pupil: mental age 11 years and 5 months; educational quotient of 80; and a classification index of 79.

Educational history.-- Pupil likes school stating that he has had lots of fun in school. His favorite subjects are history and science, because they "are interesting". The subjects he has disliked the most are English and mathematics, because they "are not interesting". English is his most-difficult subject.

His only concern is the probability of failure in English. He stated "I worry a lot about it". His English marks have been very poor throughout his school career. He cannot spell well and has been very poor in all his written work in junior high school. He has repeated grades two and seven.

He attended kindergarten before entrance into grade one. His age at entrance in grade one was 5 years and 10 months. The attendance record shows that he has been absent for 10 per cent or more of the scheduled school sessions during grades three and five.



On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 73 |
| Natural Science Background    | 75 |
| Correctness in Writing        | 35 |
| Quantitative Thinking         | 39 |
| Reading Social Science        | 21 |
| Reading Natural Science       | 69 |
| Reading Literature            | 54 |
| General Vocabulary            | 32 |
| Use of Sources of Information | 78 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 7.9 in reading, 8.6 in language usage, 5.4 in spelling, and 11.3 in arithmetic.

While in junior high school, his teachers felt that he was not working up to the limit of his abilities. His work was not completely done, but it was orderly. The marks in junior-high-school science obtained by him were C in grade seven and C- in grade eight.

The average marks for the first half-year which he received in other grade-nine subjects were A in mechanical drawing; B in history, physical education, and shop; C in English and mathematics. He carried a load of 22 diploma credits in grade nine.

Study habits.-- This pupil keeps no record of his assignments, but he states that he understands what he is to do. Although he doesn't study every day, he completes his assignments when he does study. He rarely takes notes



while studying. He makes use of other books, but does not use a dictionary. He does no homework in the subjects which he dislikes, but will study ahead of the assignments in the subjects in which he is interested.

Behavior characteristics.-- This boy has a good sense of humor. His constantly smiling personality wins him many friends. He is happy and plays well with others. His junior-high-school teachers rated him as average in the following social habits: ability to get along with others, courtesy, acceptance of responsibility, and observance of school rules. Although his conduct for the first half-year in grade nine was poor, his behavior in his science classes was excellent.

He was rated by his grade-nine teachers as satisfactory in the following traits: industry, accuracy, school adjustment, attitudes, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in emotional control, social habits, initiative, and leadership.

Environment.-- His family rents five-room living quarters in a good neighborhood which are occupied by four persons. About 100 books are owned by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil does





no outside reading. If any were done, he would prefer to read newspapers. He collects nature objects for the fun of collecting, but he states that he makes no attempt to study the objects which he has acquired. Wood-working and puzzle solving are his hobbies; he would like to play a musical instrument and draw. He is active in outdoor sports, dislikes indoor games, and attends the Community house and church. Although he declines parties, he attends dances. He does not help around the house, except to fix things in need of repair.

Pupil's associates.-- This pupil associates with older boys. He has never been a leader of a group. Although he associates only with boys, he is desirous of being in the company of girls.

Future plans.-- He intends to complete his high school education and is encouraged in this by his parents. He has no plans for post-high-school training. He has spent little time in thinking about his future, and he has no vocational plans. He thinks that he may become a carpenter.

#### Case 4

Case 4 has an intelligence quotient of 79 and is classified in intelligence-quotient group V. He has an aggregate numerical achievement of 223 and is classified in achievement group III. This pupil is enrolled in the



general course.

Census data.-- This boy entered the ninth grade at the age of 15 years and 11 months. He was born in a neighboring town where he completed his elementary school training in a parochial school. He moved to the town where he now lives prior to his entrance in junior high school.

Health and physical data.-- This pupil weighs 128 pounds and is 67 inches tall. He has a slight hearing deficiency in each ear. His teeth and vision are free from defects, but his posture is poor. He has had only the usual childhood diseases. He is above average in personal neatness.

Immediate family.-- His parents were born in this country and are alive. His father is a retired police officer who is now employed as a ticket manager; his mother is at home. Neither parent has received a high-school education. He has seven siblings.

Mental data.-- At the time he entered grade nine, the following mental data was available on this boy: mental age of 11 years and 9 months; educational quotient of 86, and a classification index of 93.

Educational history.-- This pupil accepts school in that it is "something to do". He has been extremely slow academically. He likes mathematics, because "My mother



says that you use it a lot", and drawing, see use "It is nice to know". He dislikes history, because it is old; and English, because it is too hard. The latter is his most-difficult subject. He states that he does not worry about his school marks.

This boy entered grade one at the age of 5 years and 10 months. He completed one year of kindergarten. He has repeated grades two and three. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions in grades six and eight. He seldom was tardy.

On the Iowa Tests of Educational Development given in grade 3.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 15 |
| Natural Science Background    | 60 |
| Correctness in Writing        | 35 |
| Quantitative Thinking         | 25 |
| Reading Social Science        | 21 |
| Reading Natural Science       | 24 |
| Reading Literature            | 54 |
| General Vocabulary            | 11 |
| Use of Sources of Information | 31 |

His grade equivalents on the Stanford Achievement Tests given in grade 6.8 were 6.8 in reading, 7.5 in language usage, 6.1 in spelling, and 7.3 in arithmetic.

His junior-high-school teachers felt that he wasn't working to the full limit of his abilities. His work was neither complete nor orderly. In the seventh grade, he failed science; his eighth-grade mark was C-.





The marks for the first half-year which he received in other grade-nine subjects were B in physical education, shop, and freehand drawing; C in mathematics; and D in English. He dropped mechanical drawing after the start of the school year. He carried a load of 23 diploma credits in grade nine.

Study habits.-- He keeps no written record of his assignments. "Most of the time", he understands what he is to do. He does not study every day, does not work until his assignments are complete, does not use reference books, nor take notes while he studies. He studies by himself, sometimes reviews assignments previously covered, but never studies ahead of his assignments. He rarely makes up work missed due to absence promptly.

Behavior characteristics.-- This pupil possesses a pleasant personality. He is co-operative and gets along well with other pupils and his teachers. His junior-high-school teachers rated him as above average in ability to get along with others, courtesy, and acceptance of responsibility; and as average in observance of school rules.

His conduct in grade nine was excellent. His grade-nine teachers rated him as satisfactory in the following traits: industry, emotional control, social habits, attitudes, school adjustment, group participation, and de-



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sire to excel. He was rated as unsatisfactory in accuracy, initiative, leadership, and self-confidence.

Environment.-- His family owns a twelve-room house in an excellent neighborhood which is occupied by six persons. About 200 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil's outside reading is limited to occasional reading of newspapers. He is helpful at home, aiding with the garden, fixing things, and caring for his pets. Although he doesn't engage in many outdoor sports activities, he studies nature, plays indoor games, solves puzzles, and makes collections. He feels that his only talent is his good boxing ability. He attends church regularly, but does not go to the Community House, club meetings in school, parties or dances. He has remained active in scouting. He does not work after school.

Pupil's associates.-- This boy associates with boys and girls who are older than himself. He is a scout leader and the leader of a group of boys.

Future plans.-- He plans to complete his high-school education and is encouraged in this by his parents. He has no plans for post-high-school training. He has made no decision as to what his career will be after he leaves high school.

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## Case 5

Case 5 possesses an intelligence quotient of 80 and is classified in intelligence-quotient group V. An aggregate numerical achievement of 155 resulted in classification in achievement group III. This pupil is enrolled in the commercial course.

Census data.-- This girl entered the ninth grade at the age of 15 years. She was born in a neighboring town, but she received most of her schooling in this town.

Health and physical data.-- This pupil is 63 inches tall and weighs 119 pounds. She has no defects of vision, hearing, speech, or posture. She has had only the usual childhood diseases. She suffered from recurring tonsillitis as a child until a tonsilectomy was performed. She is above average in personal neatness.

Immediate family.-- Both of her parents are alive. Her father is a painter; her mother is at home. Her mother was born in Sweden and did not complete her high-school education. Her father was born in Norway and was graduated from high school. She has four siblings.

Mental data.-- At the time this pupil began grade nine, the following mental data was available on her: mental age of 11 years and 6 months, educational quotient of 86, and a classification index of 83.

Educational history.-- She likes school very much.



Her favorite subjects were reading and spelling, because it is "possible to learn a lot" by use of them. She most disliked history and mathematics, because they were not easy. The latter is her hardest subject. She worries about her school marks.

She began school at the age of 6 years in grade one. This pupil has repeated grade three. The attendance record shows that she was absent for 10 per cent or more of the scheduled school sessions during the third and fifth grades. She seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 20 |
| Correctness in Writing        | 35 |
| Natural Science Background    | 60 |
| Quantitative Thinking         | 25 |
| Reading Social Science        | 21 |
| Reading Natural Science       | 32 |
| Reading Literature            | 30 |
| General Vocabulary            | 40 |
| Use of Sources of Information | 32 |

Her grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 6.7 in reading, 6.3 in language usage, and 6.0 in spelling.

Her junior-high-school teachers noted that she was not a consistent worker. Her science marks were C in grade seven and C- in grade eight.

The marks for the first half-year which she received in other grade-nine subjects were B in physical education;





C in English; and C- in history, junior business training, and geography. She carried a load of 20 diploma credits in grade nine.

Study habits.-- This girl makes a written notation of her assignments, but she is not always sure of what she is to do. She studies alone, but she does not study regularly. At the times that she studies, she completes her assignments, makes notes of facts to remember, and looks up unfamiliar words in the dictionary. She does homework in the subjects that she dislikes and promptly makes up work missed due to absence. She sometimes reviews work previously studied and reads ahead of her assignments.

Behavior characteristics.-- Her junior-high-school record bears the notations that this pupil is not a faithful worker and that she cheats. In class she lacks both self-control and emotional control. Although she is well intentioned and pleasant, she occasionally lacks good manners. Her conduct in grade nine was fair.

She was rated by her grade-nine teachers as satisfactory in the following traits: industry, social habits, accuracy, school adjustment, attitudes, leadership, and group participation. She was rated as unsatisfactory in emotional control, initiative, self-confidence, and desire to excel.



Environment.-- This pupil's family owns a seven-room house in a good neighborhood which is occupied by seven persons. There are about 75 books in her home. No foreign language is spoken at home.

Interests and leisure activities.-- She enjoys the outside reading of library books and newspapers. She belongs to the Community House and to the girl scouts. She goes to Sunday school and attends parties and dances. This girl helps at home a great deal, where she assists in the garden, with the family pets, and with the mending; she also works after school. She has a collection of Christmas cards, occasionally does puzzles, but dislikes indoor games, preferring to take part in outdoor sports. Her only talent is drawing, which subject she enjoyed in school.

Pupil's associates.-- This girl associates with boys and girls of her own age. She has never been a leader of a group, but she is popular among her associates.

Future plans.-- She spends considerable time thinking about her future. She plans to complete her high-school education and is encouraged in this by her parents. On finishing high school, she plans to attend a hair-dressing school.

#### Case 6

Case 6 is classified in intelligence-quotient group V, because he has an intelligence quotient of 83. He has



an aggregate numerical achievement of 256 and is classified in achievement group III. This pupil is taking a commercial course.

Census data.-- This boy entered grade nine at the age of 13 years and 11 months. He was born and received his schooling in this town.

Health and physical data.-- He is 59½ inches tall and weighs 109 pounds. His posture is poor, but he has no physical defects. He has had only the usual childhood diseases. This pupil is below average in personal neatness.

Immediate family.-- His parents were born in the United States and are alive. His father works as a metal-cutter, his mother is at home. His mother completed her high-school-education in an evening school, but his father was not graduated from high school. He has five siblings.

Mental data.-- At the time this boy entered grade nine, the following mental data was available on him: mental age of 12 years and 4 months, educational quotient of 102, and a classification index of 93.

Educational history.-- This boy likes school stating that, "It is a good place to be." His favorite subjects are shop and science, because they are interesting. The only subject which he dislikes is English, which he has found to be his hardest subject. He does not worry about





his school work. His scholarship throughout his school career has been average.

He received no schooling before he entered grade one at the age of 6 years and 0 months. He has repeated grade five. The attendance record shows that he was absent for 10 per cent or more of the scheduled sessions in grade six only. He seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 47 |
| Natural Science Background    | 31 |
| Correctness in Writing        | 39 |
| Quantitative Thinking         | 39 |
| Reading Social Science        | 4  |
| Reading Natural Science       | 19 |
| Reading Literature            | 22 |
| General Vocabulary            | 32 |
| Use of Sources of Information | 42 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 7.9 in reading, 8.6 in language usage, 7.7 in spelling, and 10.2 in arithmetic.

His junior-high-school teachers felt that he was working "beyond his capacity" when under pressure. However, his work has been neither complete nor orderly.

The average marks for the first half-year obtained by him in other grade-nine subjects were B in shop and physical education; C in history, junior business training, and geography; and C- in English. He carried a load of 22 diploma credits in grade nine.



Study habits.-- This pupil makes written notations of his assignments, but he is not always sure what he is to do. He studies by himself. His study habits are poor in that he does not study every day, does not study until his assignments are completed, does not take notes while he is studying, nor does he use other books when he studies. He occasionally used a dictionary. He does homework in subjects which he dislikes, rarely reviews material previously studied, but he will sometimes read ahead of the assignment.

Behavior characteristics.-- His junior-high-school teachers rated him as below average on the following social habits: ability to get along with others, courtesy, acceptance of responsibility, and observance of school rules. His conduct for the first half-year in grade nine was fair. He is uncooperative with other pupils and with his teachers. He bitterly resents correction.

He was rated by his grade-nine teachers as satisfactory in the following traits: industry, emotional control, social habits, school adjustment, attitudes, initiative leadership, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in accuracy.

Environment.-- His family owns a six-room house in a good neighborhood. About 10 books are possessed by the



family. No foreign language is spoken at home.

Interests and leisure activities.-- Pupil's outside reading is restricted to the occasional reading of newspapers and comic books. His hobby is woodworking, and he fixes objects around the house. He helps at home and aids with the garden and in caring for his dog. He engages in outdoor sports, plays indoor games, solves puzzles and studies nature. He attends church and goes to parties, but he does not attend dances. He has no interests in music, collecting, collections, scrapbooks, art, or creative writing. He does not work after school.

Pupil's associates.-- This pupil associates with boys and girls of his own age and gets along well with them. He has never been the leader of a group.

Future plans.-- This boy intends to complete his high-school education and is encouraged in this by his parents. He has no plans for post-high-school training. He has spent time thinking about his future but "with no results". He is undecided as to what he will do for his life's work.

#### Case 7

Case 7 had an intelligence quotient of 84 and is classified in intelligence-quotient group V. She has an aggregate numerical score of 152 and is classified in achievement group III. This pupil is enrolled in the



commercial course.

Census date.-- This girl was 14 years and 10 months old when she entered grade nine. She was born in another state, but attended the schools of this town for several years before she entered high school.

Health and physical data.-- This pupil is 62 inches tall and weighs 104 pounds. She is free from defects of vision, teeth, hearing, and speech. She had a severe skin defect which on one recent occasion caused her to be excluded from school until treatment was effected. She has had only the usual childhood diseases. She is average in personal neatness.

Immediate family.-- Her parents were born in Italy, and are alive. They did not receive a high school education. Her father is employed as a laborer; her mother is at home. She has two siblings.

Mental data.-- At the time she entered grade nine, the following mental data was available on this pupil: mental age 12 years and 0 months, educational quotient of 96, and a classification index of 92.

Educational history.-- She likes school. Her favorite subjects are drawing and science. She most disliked geography and English because they "were not interesting". The latter was her hardest subject. She worried about her school marks.





This pupil had received no previous education when she entered grade one at the age of 5 years and 10 months. She repeated the first grade. The attendance record shows that she was absent for 10 per cent or more of the scheduled school sessions during grades seven and eight.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 39 |
| Natural Science Background    | 30 |
| Correctness in Writing        | 35 |
| Quantitative Thinking         | 10 |
| Reading Social Science        | 15 |
| Reading Natural Science       | 49 |
| Reading Literature            | 20 |
| General Vocabulary            | 51 |
| Use of Sources of Information | 36 |

Her grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 8.7 in reading, 7.9 in language usage, and 7.7 in spelling.

Her junior-high-school teachers noted that she was not a student and that she did not work to the limit of her abilities. Her science marks in grades seven and eight were C-.

The average marks for the first half-year which she obtained in other grade-nine subjects were B in physical education and freehand drawing, and C in English, history, junior business training, cooking, and geography. She carried a load of 23 diploma credits in grade nine.



Study habits.-- This pupil keeps a written notation of her assignments and understands what she is to do. She studies regularly by herself until her work is completed. While studying, she makes no use of reference books, but she makes notations of facts to remember. She does homework in subjects which she dislikes and promptly makes up work missed due to absence. Although she reviews studies previously covered, she does not study ahead of her assignments.

Behavior characteristics.-- She is easy going and has a pleasant personality. Her grade-nine conduct was fair.

She was rated by her grade-nine teachers as satisfactory in the following traits: emotional control, social habits, accuracy, school adjustment, attitudes, group participation, and self-confidence. She was rated as unsatisfactory in industry, initiative, leadership, and desire to excel.

Environment.-- Her family rents six-room living quarters in an excellent neighborhood which are occupied by five persons. About 100 books are owned by the family. Italian is occasionally spoken at home.

Interests and leisure activities.-- Her outside reading includes library books, newspapers, and comic books. She is artistic and enjoys painting and drawing.



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This girl keeps a picture collection in a scrapbook, engages in outdoor sports, indoor games, and puzzle solving. She goes to church and the community house, and attends parties and dances. She works after school and helps at home. She has no interests in nature study, music, or creative writing.

Pupil's associates.-- She associates with boys and girls of her own age. Although she is very popular, she has never been the leader of a group.

Future plans.-- She has thought about her future, but she has made no plans. She "thinks" that she will complete her high-school education and is encouraged in this by her parents. She has no plans for either post-high school education or work.

#### Case 8

Case 8 has an intelligence quotient of 86 and is classified in intelligence-quotient group IV. This pupil is classified in achievement group II, because he has an aggregate numerical achievement of 212. He is taking a college course.

Census data.-- This boy was 14 years and 10 months old when he began grade nine. He was born and went to school in the town where he is now living.

Health and physical data.-- He is 61 inches tall and weighs 110 pounds. He has had only the usual child-





hood diseases, and is free from physical defects. He is average in personal neatness.

Immediate family.-- His father was born in Italy, but his mother is native born. Neither of his parents has received a high-school education. His father is employed as a caretaker; his mother is at home. He has five siblings.

Mental data.-- At the time he entered grade nine, the following mental data was available on this pupil: mental age of 12 years and 3 months, educational quotient of 96, and a classification index of 91.

Educational history.-- This pupil dislikes school and would not have attended if he was not compelled to do so. His favorite subjects are algebra and science, because they were easy. His most-disliked subjects are history and English. The latter is his most-difficult subject. He does not worry about his school marks.

He began school at the age of 5 years and 10 months in grade one. He repeated the first grade. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions during grades two, three, four, and seven. He seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:



|                               |    |
|-------------------------------|----|
| Social Science Background     | 47 |
| Natural Science Background    | 35 |
| Correctness in Writing        | 35 |
| Quantitative Thinking         | 65 |
| Reading Social Science        | 28 |
| Reading Natural Science       | 14 |
| Reading Literature            | 26 |
| General Vocabulary            | 25 |
| Use of Sources of Information | 24 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 6.8 in reading, 9.9 in language usage, 6.5 in spelling, and 8.2 in arithmetic.

In junior high school, his teachers felt that he was a good worker. They noted that he was good in mathematics but poor in science. His science marks were B- in grade seven and C- in grade eight.

The average marks for the first half-year which he received in other grade-nine subjects were as follows: B in algebra and physical education and C in English and history. He carried a load of 18 diploma credits in grade nine.

Study habits.-- This pupil makes notations of his assignments and understands what he is to do. He studies regularly by himself until his work is done. He makes use of reference books other than dictionaries and makes notations of facts to remember. He promptly makes up work missed due to absence. He neither reviews studies previously covered nor studies ahead of his assignments.

Behavior characteristics.-- Although he is shy and



immature, this boy is a behavior problem in and out of school. He is on court probation in connection with a charge of breaking and entering. In school he was found writing on the lavatory walls. His conduct in grade nine is poor.

His grade-nine teachers rated him as satisfactory in the following traits: accuracy, initiative, group participation, and self-confidence. He was rated as unsatisfactory in industry, emotional control, social habits, school adjustment, attitudes, leadership, and desire to excel.

Environment.-- His family rents six-room living quarters in a poor neighborhood which are occupied by eight people. About 50 books are owned by the family. No foreign language is spoken at home.

Interests and leisure activities.-- His outside reading is limited to newspapers and comic books. He helps at home by fixing objects in need of repair and by caring for the garden. He engages in outdoor sports, indoor games, puzzle solving, and nature study. He attends church and goes to the Community House, parties and dances. He has no interests in collections, scrapbooks, making objects, creative writing, or in art.

Pupil's associates.-- This boy associates with boys and girls of his own age. He has never been the leader



of a group.

Future plans.-- He states that he does not think about his future and that he has made no plans as to the nature of his life's work. He intends to complete his high-school education and is encouraged in this by his parents. He does not plan to secure any post-high-school training.

#### Case 9

Case 9 has an intelligence quotient of 86 and is classified in intelligence-quotient group IV. He has an aggregate numerical achievement of 225 and is classified in achievement group II. This pupil is enrolled in the general course.

Census data.-- This boy entered grade nine when he was 15 years and 1 month old. He was born and went to school in this town.

Health and personal data.-- He is 68 inches tall and weighs 100 pounds. A speech difficulty is his only physical defect. He has had only the usual childhood diseases. He is above average in personal neatness.

Immediate family.-- His parents were born in the United States and are alive. His father is a blacksmith; his mother is at home. They did not receive a high-school education. He has two siblings.

Mental data.-- At the time he entered grade nine, the





Following mental data was available on this pupil: mental age of 12 years and 11 months, Educational Quotient of 79, and a classification index of 83.

Educational history.-- This boy likes school. He neither greatly likes nor greatly dislikes any subject. English is his most-difficult subject. He worries about his school marks. He possesses an excellent imagination which he utilized in art and creative writing activities in school.

He entered grade one at the age of 6 years and 1 month after completing one year in the kindergarten. He repeated grades one and two. After failing in grade two he was assigned to a special class from which he entered grade three. The attendance record shows that he was absent for 10 per cent or more of the scheduled-school sessions during grades one and five.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 47 |
| Natural Science Background    | 22 |
| Correctness in Writing        | 48 |
| Quantitative Thinking         | 3  |
| Reading Social Science        | 15 |
| Reading Natural Science       | 30 |
| Reading Literature            | 40 |
| General Vocabulary            | 14 |
| Use of Sources of Information | 68 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 7.4 in reading, 8.3 in language



usage, 5.2 in spelling, and 7.4 in arithmetic.

In junior high school, his teachers noted that despite low native ability, he was a "plodder". His science marks were C in grade seven and C- in grade eight.

The average marks for the first half-year which he received in other grade-nine subjects were A in freehand drawing, mechanical drawing, and history; B in mathematics and physical education; and C in English. He carried a load of 21 diploma credits in grade nine.

Study habits.-- He makes no written notations of his assignments, but he states that he understands what he is to do. He does not study regularly. At the times he studies, he works by himself until his assignments are completed. He makes no notations of facts to remember, uses no reference books, and neither reviews studies previously completed nor reads ahead of his assignments. He does homework in subjects which he dislikes and promptly makes up work missed due to absence.

Behavior characteristics.-- Although this boy is reserved and gives the impression of being older than he is, he states that he "worries about everything". His junior-high-school teachers noted that he is an excellent citizen. He was rated as satisfactory in all traits by his grade-nine teachers.

Environment.-- This pupil's family owns an eight-



room house in a good neighborhood which is occupied by six people. About 200 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- His outside reading is limited to newspapers and comic books. He is artistic and likes to draw and make things. He helps at home by caring for the garden and the pets; also he works after school. This boy engages in outdoor sports, indoor games, and he attends parties and dances. He goes to church regularly. He has no interests in puzzle solving, nature study, creative writing, or collections.

Pupil's associates.-- He associates with boys and girls who are both older and younger than himself. He is the leader of a group and is very popular with other pupils.

Future plans.-- This boy has not thought about his future and has not made any decision as to the nature of his life's work. He plans to complete his high-school-education and is encouraged in this by his parents. He does not intend to secure post-high-school training.

#### Case 10

Case 10 has an intelligence quotient of 86 and is classified in intelligence-quotient group IV. His aggregate numerical achievement of 231 results in his classification in achievement group II. He is enrolled in the





general course.

Census data.-- At the time he entered grade nine, this pupil was 15 years old. He was born in an adjacent community where he attended elementary school. He received his junior-high-school education in this town.

Health and physical data.-- This boy is oversized for his age. He is 70 inches tall and weighs 192½ pounds. He doesn't talk distinctly and has moderately defective teeth. This pupil has had only the usual childhood diseases. He is below average in personal neatness.

Immediate family.-- His parents were born in this country and are alive. They did not receive a high-school education. His father is employed as a wool-bagger; his mother is at home. He has one brother.

Mental data.-- The following mental data was available on this pupil when he entered grade nine. mental age of 12 years and 4 months, educational quotient of 97, and a classification index of 92.

Educational history.-- He has liked school. His most-liked subjects are arithmetic and science. He dislikes reading and spelling. English is his most-difficult subject. He does not worry about his school work.

He entered kindergarten at the age of 4 years. A year later he began grade one. He repeated grades two and five. The attendance record shows that he was absent



for 10 per cent or more of the scheduled-school sessions during nine of his previous ten school years. He seldom was tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 31 |
| Natural Science Background    | 69 |
| Correctness in Writing        | 35 |
| Quantitative Thinking         | 77 |
| Reading Social Science        | 39 |
| Reading Literature            | 40 |
| Reading Natural Science       | 19 |
| General Vocabulary            | 8  |
| Use of Sources of Information | 21 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 7.9 in reading, 8.8 in language usage, 7.2 in spelling, and 10.1 in arithmetic.

His junior-high-school teachers noted that he was a good worker. His science marks were B- in grade seven and B in grade eight.

The average marks for the first half-year which he obtained in other grade-nine subjects were A in mathematics; B in physical education, mechanical drawing, and history; and C in English and free-hand drawing. He carried a load of 21½ diploma credits in grade nine.

Study habits.-- This pupil makes no notations of his assignments, but he understands what he is to do. He does not study regularly. At the times he studies, he does so alone until he completes his assignments. He does not



use reference books, but he makes notations of facts to remember while he studies. He reviews work previously covered and studies ahead of his assignments. He does assignments in subjects which he dislikes, and he makes up work missed due to absence promptly.

Behavior characteristics.-- This pupil likes to be in the limelight and will make coarse remarks in class to attain this goal. His grade-nine conduct was good.

His grade-nine teachers rated him as satisfactory in the following traits: industry, accuracy, school adjustment, attitudes, initiative, leadership, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in emotional control and social habits.

Environment.-- His family owns a six-room house in a good neighborhood which is occupied by five persons. About 100 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil reads newspapers and library books. He is interested in mechanical things and likes to take apart and repair them. He engages in outdoor sports, indoor games, and puzzle solving. He attends church and the Community House and goes to parties and dances. This boy helps at home and works after school. He is a member of the boys glee club in school.



and likes to draw. He has no interests in nature study or collections.

Pupil's associates.-- He associates with boys and girls who are older than himself. He never was a leader of a group, but he is very popular among his friends.

Future plans.-- This boy has thought about his future. He intends to attend a vocational school and learn a mechanical trade after completing grade nine. He is encouraged in these plans by his parents.

#### Case 11

Case 11 has an intelligence quotient of 87 and is classified in intelligence-quotient group IV. An aggregate numerical achievement of 199 results in his classification in achievement group II. He is taking a general course.

Census data.-- This boy was 13 years and 7 months old when he entered grade nine. He was born in an adjacent community and received the greater part of his previous schooling in other towns. He attended grade eight in this town.

Health and physical data.-- He is 53½ inches tall and weighs 104 pounds. He had the usual childhood diseases and now has a hepatic condition. He has very poor personal hygiene and is much below average in this





respect.

Immediate family.-- His parents were born in this country and are alive; they are separated. He lives with his mother and her parents. His mother is employed as a factory worker; she received a high-school-education. The school nurse noted that his father is a heavy drinker; and that the family fares better when the father is in jail, and they get welfare funds. He has five siblings.

Mental data.-- At the time he entered grade nine, the following mental data was available on this pupil: mental age of 12 years and 10 months, educational quotient of 89, and a classification index of 88.

Educational history.-- This pupil has an indifferent attitude regarding school attendance. His favorite subjects are mathematics and science, because he "likes figure work". English is the subject he most dislikes and finds the hardest. He worries about his school marks.

He entered grade one at the age of 5 years and 7 months after completing one year of kindergarten. He repeated grades one and five. The attendance records are not available on this boy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                            |    |
|----------------------------|----|
| Social Science Background  | 11 |
| Natural Science Background | 69 |



|                               |    |
|-------------------------------|----|
| Correctness in Writing        | 5  |
| quantitative Thinking         | 31 |
| Reading Social Science        | 21 |
| Reading Natural Science       | 40 |
| Reading Literature            | 16 |
| General Vocabulary            | 52 |
| Use of Sources of Information | 20 |

Grade equivalents on the Stanford Achievement Tests are not available on this pupil.

His junior-high-school teachers felt that he worked close to the limits of his abilities. His science mark in grade eight was C.

The average marks for the first half-year which he received in other grade-nine subjects were A in freehand drawing; B in mathematics, history, mechanical drawing, and physical education; and C in English. He carried a load of 21 diploma credits in grade nine.

Study habits.-- This pupil makes no notations of his assignments and does not always understand what he is to do. He states that he does not study regularly, that he does not complete his assignments when he studies, that he makes no use of reference books, and that he makes no notations of facts to remember. He "tries" to make up work missed due to absence promptly. Although he reviews studies previously covered, he does not study ahead of his assignments. He does homework in subjects which he dislikes.

Behavior characteristics.-- He seems interested in



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in bettering himself. He is industrious and attempts to co-operate with his teachers, but he is in need of constant guidance. His conduct in grade nine was good.

His grade-nine teachers rated him as satisfactory in the following traits: industry, emotional control, social habits, accuracy, school adjustment, initiative, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in attitudes and leadership.

Environment.-- The family rents a six-room house in a poor neighborhood which is occupied by eight persons. The house has no modern conveniences. Only a few books are possessed by them. No foreign language is spoken at home.

Interests and leisure activities.-- This boy is very interested in radio technology. He does not do much out-of-school reading, and then only in comic books. Most of his time out of school is spent working. He does not help around the house. He helps with the care of the garden. He enjoys drawing and is a member of the high-school photography club. Pupil attends church, but he does not go to parties or dances. He engages in outdoor sports. He has no interests in nature study, puzzle solving, collections, scrapbooks, or indoor games.

Pupil's associates.-- He associates with boys and girls who are both older and younger than himself. How-

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ever, he does not often go with girls. He has never been the leader of a group.

Future plans.-- This pupil intends to finish his high-school education; however, he is not encouraged in this by his mother. He is undecided about his plans for future training, but he is interested in becoming a radio technician.

#### Case 12

Case 12 has an intelligence quotient of 92 and is classified in intelligence-quotient group IV. She has an aggregate numerical achievement of 209 and is classified in achievement group II. This pupil is enrolled in the commercial course.

Census data.-- This girl entered the ninth grade at the age of 13 years and 2 months. She was born in an adjacent community, but she received her previous schooling in the town where she now lives.

Health and physical data.-- She is 61½ inches tall and weighs 94 pounds. She has slight defects of her feet, teeth, glands, skin, and hearing. She is free from defects of speech and vision. She has had only the usual childhood diseases. She is above average in personal neatness.

Immediate family.-- Her parents were born in Italy and are alive. They have received a high-school education.



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Her father is employed as a mechanic; her mother is at home. She has five siblings.

Mental data.-- When she began grade nine, the following mental data was available on this pupil: mental age of 13 years and 5 months, educational quotient of 89, and a classification index of 91.

Educational history.-- Pupil likes school very much. English and mathematics are her favorite subjects. She most dislikes history and geography and has found them hardest "because of locations". She worries about her school marks.

She began her schooling at the age of 6 years and 2 months in grade one. She has repeated grade four. The only grade in which she was absent for 10 per cent or more of the scheduled sessions was the fourth. She has seldom been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |     |
|-------------------------------|-----|
| Social Science Background     | 2   |
| Natural Science Background    | 22  |
| Correctness in Writing        | 61  |
| Quantitative Thinking         | 3   |
| Reading Social Science        | 15  |
| Reading Natural Science       | 19  |
| Reading Literature            | 22  |
| General Vocabulary            | 111 |
| Use of Sources of Information | 38  |

Her grade equivalents on the Stanford Achievement Tests given in grade 8.9 were 7.8 in reading, 10.5 in language



usage, 9.5 in spelling, and 7.9 in arithmetic.

Her junior-high-school teachers noted that she was a good worker. Her science marks were B in grade seven and B- in grade eight.

The average marks for the first-half year which she obtained in other grade-nine subjects were A in geography; B in English, junior business training, and cooking; and C in history and physical education. She carried a load of 22 diploma credits in the ninth grade.

Study habits.-- This pupil regularly makes notations of her assignments and "almost always" understands what she is to do. She studies regularly by herself until her assignments are completed. She makes use of reference books and while she studies made notations of facts to remember. She promptly makes up any work which she missed due to absence and does homework in subjects which she dislikes. She neither reviews studies previously covered nor studies ahead of her assignments.

Behavior characteristics.-- This girl is shy but very cheerful. She is anxious to please her teachers and to receive good marks. Her junior-high-school teachers noted that she possessed a pleasing personality. Her conduct in grade nine was excellent.

She was rated as satisfactory by her grade-nine teachers in the following traits: industry, emotional



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control, social habits, accuracy, school adjustment, attitudes, initiative, leadership, group participation, self-confidence, and desire to excel. She was rated as unsatisfactory in none of the traits upon which she was rated.

Environment.-- Her family owns a seven-room house in an excellent section of town which is occupied by six persons. They possess about 150 books. No foreign language is spoken at home.

Interests and leisure activities.-- Pupil enjoys reading library books, newspapers, and comic books. She is a talented singer. She collects coins, maintains a scrapbook of pictures of movie stars, sews, and draws. She engages in outdoor sports, indoor games, puzzle solving and nature study. This girl attends church and the Community House, and goes to parties and dances. She works after school and in the school cafeteria. At home she helps her mother, cares for the garden, and takes care of the pets.

Pupil's associates.-- She associates with boys and girls of her own age. She has been a leader of a group of girls.

Future plans.-- This girl intends to complete her high-school education and is encouraged in this by her parents. She does not plan to secure any post high-





school training, but desires to obtain a position as a secretary or a typist.

### Case 13

Case 13 is classified in intelligence-quotient group IV, because he has an intelligence quotient of 93. He has an aggregate numerical achievement of 218 and is classified in achievement group II. This pupil is enrolled in the college course.

Census data.-- This boy was 12 years and 3 months old when he began grade nine. He was born and went to school in the town where he now lives.

Health and physical data.-- He is 68 inches tall and weighs 112 pounds. He had only the usual childhood diseases, but has no physical defects. He is average in personal neatness.

Immediate family.-- Both of his parents were born in Italy and are alive. His father is employed as a laborer; his mother is at home. Neither of his parents received a high-school education. He has eight siblings.

Mental data.-- At the time he entered grade nine, the following mental data was available on this pupil: mental age of 12 years and 11 months, educational quotient of 107, and a classification index of 100.

Educational history.-- He dislikes school and would not have attended if he was not compelled to do so. Al-



gebra and science are his favorite subjects, because they were "easiest". History and English are the subjects he most dislikes. The latter is his most difficult subject. He does not worry about his school marks.

This pupil entered grade one at the age of 6 years and 2 months after completing one year in the kindergarten. He has repeated no grades. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions only during grade four. He seldom has been tardy.

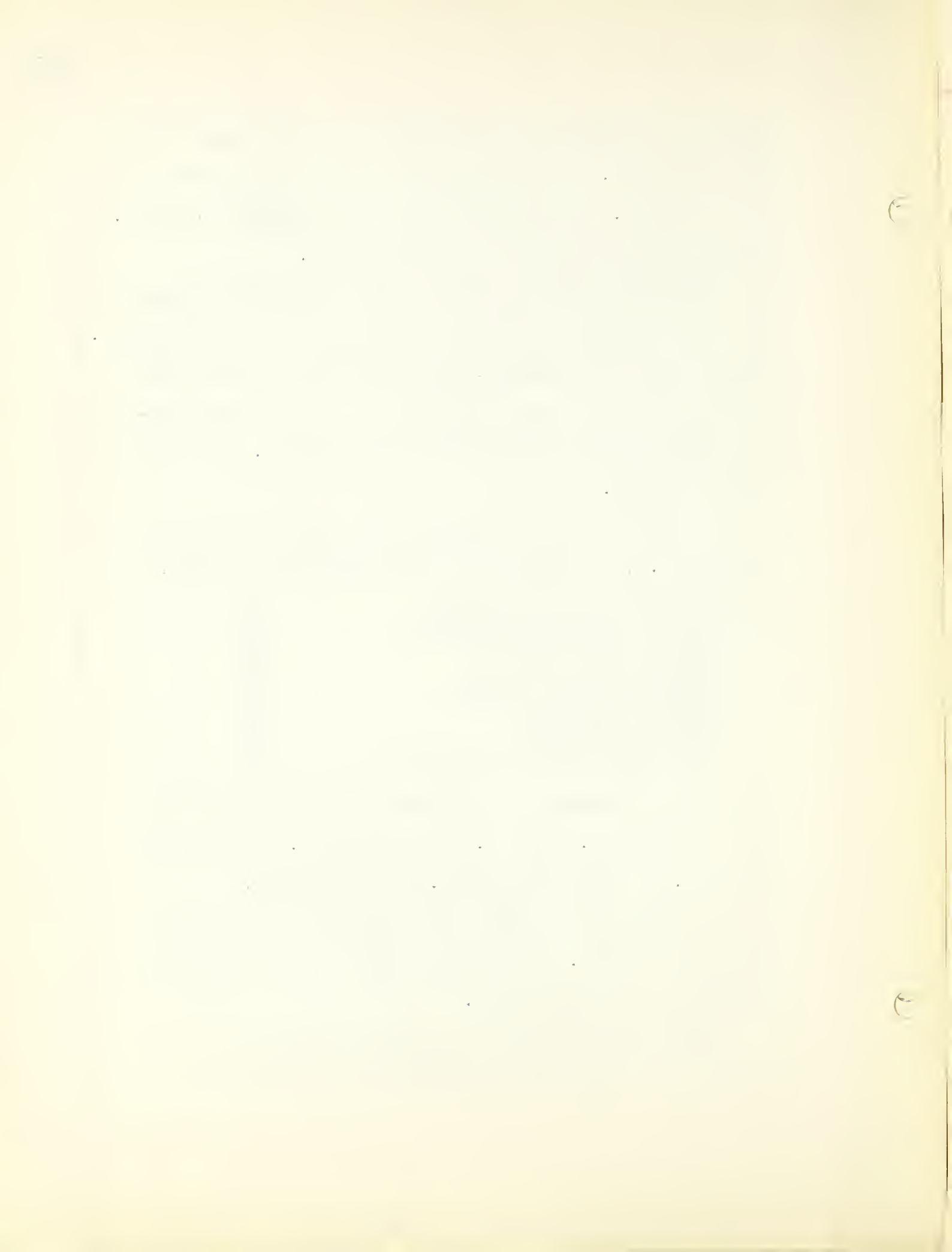
On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 11 |
| Natural Science Background    | 69 |
| Correctness in Writing        | 73 |
| Quantitative Thinking         | 25 |
| Reading Social Science        | 15 |
| Reading Natural Science       | 40 |
| Reading Literature            | 45 |
| General Vocabulary            | 11 |
| Use of Sources of Information | 57 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 8.6 in reading, 8.1 in language usage, 9.6 in spelling, and 8.9 in arithmetic.

In junior high school, his teachers noted that he was a good worker. His science marks were C- in grade seven and C in grade eight.

The marks for the first half-year obtained by him in his other grade-nine subjects were B in physical



education and C in algebra, English, and history. He carried a load of 13 diploma credits in grade nine.

Study habits.-- This boy makes notations of his assignments and understands what he is to do. He studies regularly by himself until his assignments are completed. He makes no use of reference books and does not make notations of facts to remember. He promptly makes up work missed due to absence and does homework in subjects which he dislikes. He neither reviews studies previously covered nor studies ahead of the assignments.

Behavior characteristics.-- He constantly smiles and laughs in class for reasons which were not apparent to his classmates or his teachers. He is temperamental and headstrong and is unable to take criticism. His grade-nine conduct was poor. His attitudes in junior high school were poor.

He was rated by his grade-nine teachers as having the following satisfactory traits: emotional control, accuracy, school adjustment, attitudes, initiative, group participation, self-confidence, and desire to excel. She was rated as unsatisfactory in industry, social habits, and leadership.

Environment.-- His family owns an eight-room house in a fair neighborhood which is occupied by nine persons. About 100 books are possessed by the family. Italian is





spoken at home.

Interests and leisure activities.-- He plays the accordion and is interested in music. To a lesser extent he draws and enjoys art. His outside reading is limited to newspapers and comic books. He likes to fix things around the house and to build bookcases and lamps. Although he does not work after school, he helps around the house and cares for the garden and the pets. This pupil engages in outdoor sports, plays indoor games, solves puzzles, and studies nature. He attends parties and dances, the Community House, and church.

Pupil's associates.-- His associates are boys and girls of his own age. He has never been a leader of a group but is very popular with the boys.

Future plans.-- He intends to complete his education in high school and is encouraged in this by his parents. He decided to make his career as an accordionist and does not plan any post-high school studies.

#### Case 14

Case 14 has an intelligence quotient of 93 which classifies her in intelligence-quotient group IV. An aggregate numerical achievement of 246 resulted in her classification in achievement group II. This pupil is enrolled in the college course.

Census data.-- This girl entered grade nine at the



age of 13 years and 8 months. She was born in the mid-West, but was taken to Germany at the age of 1 year and 6 months. She received her elementary schooling in Germany, returning to this country prior to her entrance into a junior high school in this town. About nine months of her stay in Germany was spent in concentration camp for children.

Health and physical data.-- She is 62 inches tall and weighs 137 pounds. She has a slight visual defect in the right eye and a slight loss of hearing in both ears. This pupil has periodic nosebleeds, but otherwise her general health is good. She had the usual childhood diseases. She is above average in personal neatness.

Immediate family.-- Her father is dead, her mother and her only sister are living in Germany. Her mother received a high school education, but her father did not. Her parents were born in Germany. She is living with an aunt in this country.

Mental data.-- At the time of her entrance into grade nine, the following mental data was available on this pupil: mental age of 13 years and 0 months, educational quotient of 93, and a classification index of 94.

Educational history.-- Her education in Germany was in an all girls school where she feels that the work was



much more difficult than in this country. She received her knowledge of English from her mother.

She "loves" school. Her favorite subjects are languages and science, because they are "easy". Physical education is the only subject which she dislikes, because she is not fond of sports. Algebra is her most-difficult subject. She worries about her school tests.

This pupil states that she began her schooling in Germany at the age of 3 years and 6 months in grade one. She has not repeated any grades. No data is available regarding her elementary-school attendance.

On the Iowa Tests of Educational Development given in grade 8,9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 39 |
| Natural Science Background    | 17 |
| Correctness in Writing        | 73 |
| Quantitative Thinking         | 31 |
| Reading Social Science        | 60 |
| Reading Natural Science       | 73 |
| Reading Literature            | 54 |
| General Vocabulary            | 20 |
| Use of Sources of Information | 29 |

Her grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 7.4 in reading, 11.3 in language usage, 10.8 in spelling, and 10.4 in arithmetic.

Her junior-high-school teachers felt that she was an excellent worker, quick to grasp work, and very dependable. Her science marks were B in grades seven and eight.

The marks for the first half-year which she received



in other grade nine subjects were B in English, history, cooking, and physical education and C in algebra. She carried a load of 19½ diploma credits in grade nine.

Study habits.-- She makes a written notation of her assignments and understands what she is to do. She studies by herself regularly until her work is done. She makes use of reference books and makes notations of facts to remember. This girl does homework in subjects which she dislikes and promptly makes up work missed due to absence. She reviews work previously covered, but reads ahead of her assignments in language subjects only. As observed by the writer in the study halls, this girl is a very diligent worker.

Behavior characteristics.-- In her actions and mannerisms this girl appears older than she is. Her grade-nine teachers rated her as satisfactory in all traits except leadership in which she was not observed. Her conduct in grade nine was excellent.

Environment.-- Her aunt rents a six-room house in a good neighborhood which is occupied by five people. About 100 books are possessed by them. No foreign language is spoken at home.

Interests and leisure activities.-- This girl plays the piano and sings. She is a member of the school glee and dramatics clubs. She likes to draw and to design.





She reads the newspaper, but states that she has insufficient time to read library books. She works after school and helps around the house with the sewing, gardening, and the fixing of objects in need of repair. She attends church and goes to parties and dances. This girl has no interests in puzzle solving, nature study, scrapbooks, or collections.

Pupil's associates.-- Her associates are boys and girls who are younger than herself. She has never been the leader of a group.

Future plans.-- She has made her plans for the future and has decided to complete her high-school education. She is encouraged in this by her mother and her aunt. She plans to secure post-high-school training in the language field and to make her career as a teacher of languages.

#### Case 15

Case 15 has an intelligence quotient of 97 and is classified in intelligence-quotient group IV. She has an aggregate numerical achievement of 104 and is classified in achievement group II. This pupil is taking a commercial course.

Census data.-- At the time this girl entered grade nine, she was 14 years and 3 months old. She was born and received her schooling in the town where she now lives.



Health and physical data.-- This girl is 61½ inches tall and weighs 137½ pounds. She has had only the usual childhood diseases, and she is free of physical defects. She is above average in personal neatness.

Immediate family.-- Her parents were born in this country and are alive. They have received a high-school education. Her father is employed as a truck driver; her mother is at home. She has no siblings.

Mental data.-- The following mental data was available on this girl when she began grade nine: mental age of 13 years and 5 months, educational quotient of 94, and a classification index of 96.

Educational history.-- This pupil likes school. Her favorite subjects are science and mathematics. She most dislikes history and geography. History is her most-difficult subject and is her only source of worry.

She had received no previous schooling when she entered grade one at the age of 6 years and 3 months. She has repeated no grades. The attendance record shows that she was absent for 10 per cent or more of the school sessions during the first, sixth, seventh, and eighth grades. She seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:



|                               |    |
|-------------------------------|----|
| Social Science Background     | 52 |
| Natural Science Background    | 60 |
| Correctness in Writing        | 55 |
| Quantitative Thinking         | 31 |
| Reading Social Science        | 23 |
| Reading Natural Science       | 40 |
| Reading Literature            | 35 |
| General Vocabulary            | 51 |
| Use of Sources of Information | 34 |

Her grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 7.1 in reading, 3.6 in language usage, and 5.2 in spelling.

Her junior-high-school teachers noted that she had worked close to the limits of her abilities. Her science marks were B in grade seven and B- in grade eight.

The marks for the first half-year which she received in other grade-nine subjects were A in physical education; B in English, geography, and cooking; and C in junior business training and history. She carried a load of 22 diploma credits in the ninth grade.

Study habits.-- This pupil makes no notations of her assignments, but she states that she understands what she is to do. She studies regularly by herself, usually until her work is done. She does not use reference books, but she makes notations of facts to remember. She does assignments in the subjects which she dislikes; however, she neither promptly makes up work missed due to absence nor review subject matter previously covered. She studies ahead of her assignments.





Behavior characteristics.-- Although she is sometimes talkative, this girl's conduct in school has been excellent. She exercises mature judgement in regard to school and outside activities.

Her grade-nine teachers rated her as satisfactory in the following traits: emotional control, social habits, accuracy, school adjustment, attitudes, group participation, self-confidence, industry, and desire to excel. She was rated as unsatisfactory in initiative and leadership.

Environment.-- Her family owns an eight-room house in a good neighborhood which is occupied by four persons. About 300 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This girl is talented in art and music. She is a member of the school glee club. She makes handicrafts, tables, tools, draws and paints, keeps a diary, collects shells, and reads literary books and newspapers. She works after school, helps at home, mends things in need of repair, and cares for the garden and pet. This girl attends church and the Community House. She engages in outdoor sports, indoor games, and solves puzzles. She goes to parties and dances and is a member of the scouts. She has no interest in nature study.

Pupil's associates.-- Her associates are older boys



and girls. She is very popular with other pupils and was the leader of a group.

Future plans.-- This girl has thought about her future. She has decided to complete her high-school education and is encouraged in this by her parents. She plans to receive additional training in an art school which will prepare her for a career as a crafts instructor.

#### Case 16

Case 16 has an intelligence quotient of 97 and is classified in intelligence-quotient group IV. He has an aggregate numerical achievement of 237 and is classified in achievement group II. He is enrolled in the general course.

Census data.-- At the time he entered grade nine, this boy was 14 years and 11 months old. He was born in an adjacent community, but he attended the schools in this town.

Health and physical data.-- This boy is 70½ inches tall and weighs 175 pounds. He possesses poor posture, but he has no other physical defects. He has had only the usual childhood diseases. He is above average in personal neatness.

Immediate family.-- His parents are native born and are alive. Only his father received a high-school educa-



tion. His father is employed as a baker; his mother is at home. He has three siblings.

Mental data.-- The following mental data was available on this pupil when he began grade nine: mental age 13 years and 10 months, educational quotient of 89, and a classification index of 94.

Educational history.-- This boy has an indifferent attitude about school attendance and would not have attended if he were not compelled to do so. Science and mathematics are the subjects he likes best, because they are "interesting". History and English are the subjects which he dislikes the most. The latter is his most-difficult subject. His school work is handicapped by his inability to write legibly. He does not worry about his school marks.

He began school at the age of 5 years and 11 months in grade one. He repeated the fifth grade. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions during grades two, four, five, and eight. He seldom was tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                            |    |
|----------------------------|----|
| Social Science Background  | 67 |
| Natural Science Background | 96 |
| Correctness in Writing     | 17 |
| Quantitative Thinking      | 65 |
| Reading Social Science     | 60 |



|                               |    |
|-------------------------------|----|
| Reading Natural Science       | 75 |
| Reading Literature            | 55 |
| General Vocabulary            | 61 |
| Use of Sources of Information | 54 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 8.6 in reading, 7.7 in language usage, 5.4 in spelling, and 10.1 in arithmetic.

In junior high school, his teachers noted that he did not work to the limits of his abilities and that his work was neither complete nor orderly. They observed that he had good reasoning power. He failed science in the seventh and eighth grades.

His marks for the first half-year in other grade-nine subjects were B in physical education and history, and C in English, mathematics, and mechanical drawing. He carried a load of 22 diploma credits in grade nine.

Study habits.-- This pupil makes a written notation of his assignments and states that he understands what he is to do. He studies regularly by himself until his work is completed. He neither uses reference books nor makes notations of facts to remember. This boy promptly makes up work missed due to absence, reviews work previously studied, and reads ahead of his assignments. He does homework in subjects which he dislikes.

Behavior characteristics.-- This pupil is friendly, co-operative, and quiet. His junior-high-school teachers





rated him as above average in the following social traits: ability to get along with others, courtesy, acceptance of responsibility, and observance of school rules.

His conduct in grade nine was good. His grade-nine teachers rated him as satisfactory in the following traits: industry, emotional control, social habits, accuracy, attitudes, school adjustment, initiative, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in leadership.

Environment.-- His family owns an eight-room house in a good neighborhood which is occupied by six persons. At least 200 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- He has some artistic ability and likes to draw and paint. He sings, reads newspapers, and makes things. He does not work after school, but he helps at home. He attends church and goes to parties and dances. This boy is a member of the boy scouts and engages in outdoor sports. He has no interests in puzzle solving, nature study, or indoor games.

Pupil's associates.-- He associates with boys who are older than himself. He does not go with girls. He never has been the leader of a group.

Future plans.-- Although his parents encourage him to complete his high-school education, he intends to leave



school at the age of sixteen. He has thought about his future and does not plan to obtain any other training. He wants to secure employment as a driver.

#### Case 17

Case 17 has an intelligence quotient of 109 and is classified in intelligence-quotient group III. He has an aggregate numerical achievement of 204 and is classified in achievement group I. He is taking the college course.

Census data.-- This boy was 14 years old when he entered grade nine. He was born in a neighboring town, but he received his previous schooling in this town.

Health and physical data.-- He is 65 inches tall and weighs 127 pounds. He has had only the usual childhood diseases and is free from physical defects. He is above average in personal neatness.

Immediate family.-- His parents were born in Italy and are alive. They did not receive a high-school education. His father is employed as a chauffeur; his mother is at home. He has one brother.

Mental data.-- At the time he entered grade nine, the following mental data was available on this boy: mental age of 14 years and 11 months, educational quotient of 110, and a classification index of 109.

Educational history.-- Pupil's attitude about school



is one of indifference. Geography and ancient history appeal to him, and he dislikes English. Algebra is his most-difficult subject. Although his previous school marks have been good, he states that he constantly worries about his marks.

He had received no previous schooling when he entered grade one at the age of 6 years and 1 month. He has not repeated any grades. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions during the first and eighth grades. He seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 91 |
| Natural Science Background    | 91 |
| Correctness in Writing        | 55 |
| Quantitative Thinking         | 89 |
| Reading Social Science        | 85 |
| Reading Natural Science       | 92 |
| Reading Literature            | 80 |
| General Vocabulary            | 58 |
| Use of Sources of Information | 92 |

His grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 11.2 in reading, 9.9 in language usage, and 8.6 in spelling.

His junior-high-school teachers noted that he was an excellent student in that he worked to the best of his abilities in a thorough and orderly manner. His science marks were A in grade seven and B- in grade eight.





The average marks for the first half-year which he received in other grade-nine subjects were all Bs. He carried a load of 25 diploma credits in the ninth grade.

Study habits.-- This boy studies regularly by himself until his assignments are completed. While he studies, he makes use of reference books and makes notations of facts to remember. He promptly makes up work missed due to absence. He makes a written notation of his assignments and "most always" understands what he is to do. He regularly reviews studies previously covered, but he reads ahead of his assignments only in language subjects.

Behavior characteristics.-- Although this pupil has a pleasing personality, he has some crude social habits. His grade-nine-conduct was good.

He was rated by his grade-nine teachers as satisfactory in the following traits: initiative, emotional control, social habits, accuracy, school adjustment, attitudes, initiative, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in leadership.

Environment.-- His family rents a five-room house in a poor neighborhood which is occupied by three persons. About 30 books are owned by the family. Italian is spoken at home.

Interests and leisure activities.-- He does some out-



side reading, principally in newspapers. He plays the baglo, collects pictures of airplanes, makes model aircraft, and keeps a picture scrapbook. He attends church and goes to parties. He does not go to dances. This boy likes to do puzzles, but he has little interests in nature study, outdoor sports, and indoor games. He works after school and helps at home. He also fixes things at home which are in need of repair.

Pupil's associates.-- He associates with boys and girls of his own age. He states that he was a leader of a group of boys; however, his leadership abilities were not observed by his grade-nine teachers.

Future plans.-- He intends to complete his high-school education and is encouraged in this by his parents. He has decided to secure further education upon his graduation from high school and to make his life's work in the language field.

#### Case A

Case A has an intelligence quotient of 125 and is classified in intelligence-quotient group I. She has an aggregate numerical achievement of 260 and is classified in achievement group III. This pupil is enrolled in the commercial course.

Census data.-- This girl entered the ninth grade at the age of 13 years and 3 months. She was born and at-



tened school in this town.

Health and physical data.-- She is 53 inches tall and weighs 103½ pounds. She has slightly defective adenoids and glands and moderately defective tonsils. She has had only the usual childhood diseases. This girl is average in personal neatness.

Immediate family.-- Her parents were born in the United States; her father is deceased. Her mother does not work. Neither of her parents was graduated from high school. She has five siblings.

Mental data.-- The following mental data was available on this pupil when she began grade nine: mental age of 16 years and 6 months, educational quotient of 118, and a classification index of 122.

Educational history.-- This girl likes school very much. English and mathematics are her favorite subjects, because she "knows how to do them". She dislikes geography and science, because she couldn't "seem to get them". The latter is her most-difficult subject. She constantly worries about her marks in science.

She began her schooling at the age of 5 years and 3 months in grade one. She has repeated no grades. The attendance record shows that she was absent for 10 per cent or more of the school sessions only in the second grade. She seldom was tardy.



On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 62 |
| Natural Science Background    | 48 |
| Correctness in Writing        | 67 |
| Quantitative Thinking         | 60 |
| Reading Social Science        | 79 |
| Reading Natural Science       | 75 |
| Reading Literature            | 65 |
| General Vocabulary            | 51 |
| Use of Sources of Information | 31 |

Her grade equivalents on the Stanford Achievement Tests given in grade 8.8 were 9.5 in reading, 9.9 in language usage, 11.3 in spelling, and 8.8 in arithmetic.

She was an honor student in junior high school. Her teachers felt that she worked to the best of her abilities and that her work was steady and orderly. Her science marks were B in grades seven and eight.

The marks for the first half-year which she received in other grade-nine subjects were A in geography; B in English, history, and physical education; and C in junior business training. She carried a load of 20 diploma credits in grade nine.

Study habits.-- This girl makes a written notation of her assignments; however, she understands what she is to do only "half of the time". She does not ask the teacher for clarification of the assignments, because she does not "see any sense" in the units being studied. Although she doesn't study regularly, she studies by herself until





her work is done, makes use of reference books, and sometimes takes notes of facts to remember. She promptly makes up work missed due to absence and does homework in subjects which she dislikes. She neither reviews studies previously covered nor reads ahead of her assignments.

Behavior characteristics.-- Her junior-high-school teachers rated her as above average in the following social habits: ability to get along with others, courtesy, acceptance of responsibility, and observance of school rules. Her conduct is good. She was chosen class treasurer in grade eight.

She was rated as satisfactory by her grade-nine teachers in all the traits on which she was rated.

Environment.-- Her family owns a six-room house in a good neighborhood which is occupied by the pupil and her mother. They possess about 100 books. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil enjoys reading library and comic books. She likes to write compositions and feels that she has writing talent. She is a member of the school cheer club, church youth organization, and regularly goes to church. She attends parties and dances. She plays indoor games and engages in outdoor sports. At home she helps her mother; she also works after school. She has no interests in puzzle sol-



ving, fixing or mending things, gardening, caring for pets, music, nature study, or collections.

Pupil's associates.-- She associates with older boys and girls. She has never been the leader of a group out of school. She is very popular with other pupils.

Future plans.-- This girl has thought about her future. She has decided to complete her high-school education and is encouraged in this by her mother. After leaving high school, she desires to attend a nursing school and to enter the nursing profession.

#### Case B

As a result of an intelligence quotient of 124, case B is classified in intelligence-quotient group I. She has an aggregate numerical achievement of 262 and is classified in achievement group III. She is enrolled in the college course.

Genetic data.-- At the time this girl began grade nine, she was 15 years and 4 months old. She was born in an adjacent community, but she attended school in this town.

Health and physical data.-- This pupil is 58 inches tall and weighs 112 pounds. She has a slight visual defect which is corrected by the wearing of lenses. While in junior high school, the school authorities reported the



presence of many dental caries to her parents. She has promotion teeth, left with the right. She also has a slight hearing deficiency in both ears as an aftermath of mastoid operations in each ear. She is above average in personal neatness. While in junior high school, she was absent a great deal due to minor illnesses. She worries about her health.

Immediate family.-- Her parents were born in the United States and are alive. Her father works as a jail guard; her mother is at home. Only her father received a high-school education. She has two siblings.

Mental data.-- The following mental data was available on this pupil when she entered grade five: mental age of 16 years and 5 months, educational quotient of 114, and a classification index of 120.

Educational history.-- This girl likes school. Her favorite subjects are mathematics and science, because she "could do them". The only subject which she dislikes is English, which is her hardest subject, because she "couldn't catch on". She worries about her school marks.

She entered grade one at the age of 5 years and 4 months after completing a year in kindergarten. She has repeated no grades. The attendance record shows that she was absent for 10 per cent or more of the school sessions during six of her previous eight school years. She seldom





has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 54 |
| Natural Science Background    | 60 |
| Correctness in Writing        | 67 |
| Quantitative Thinking         | 65 |
| Reading Social Science        | 60 |
| Reading Natural Science       | 61 |
| Reading Literature            | 65 |
| General Vocabulary            | 65 |
| Use of Sources of Information | 66 |

Her grade equivalents on the Stanford Achievement Test given in grade 8.8 were 10.8 in reading, 11.3 in language usage, 9.9 in spelling, and 11.1 in arithmetic.

Her junior-high-school teachers noted that she lacked steady, purposeful endeavor. She worked close to her best abilities and did her work in an orderly and complete manner. Her science marks were C- in grade seven and C in grade eight.

The average marks for the first half-year which she received in other grade-nine subjects were B in algebra, physical education, history, and cooking, and C in English. She carried a load of 20 diploma credits in grade nine. She was absent for close to 20 per cent of the scheduled school sessions during the first half-year in grade nine.

Study Habits.-- She makes notations of her assignments and usually understands what she is to do. She studies regularly by herself until her assignments are



completed. This girl makes use of reference books and writes down facts to remember. She promptly makes up work missed due to absence and does homework in subjects which she dislikes. Although she reviews material previously covered, she does not read ahead of her assignments.

Behavior characteristics.-- This pupil is very friendly and likable. She was rated by her junior-high-school teachers as average in the following social habits: ability to get along with others, courtesy, acceptance of responsibility, and observance of school rules.

Her grade-nine conduct was good. She was rated by her grade-nine teachers as satisfactory in all traits on which she was rated.

Environment.-- Her family owns a six-room house in a good neighborhood which is occupied by five persons. They possess about 100 books. No foreign language is spoken at home.

Interests and leisure activities.-- This girl has a good voice; she receives vocal training and is a member of the school glee club. She reads library books, newspapers, and comic books. She keeps a scrapbook of a picture collection and makes pot holders. She writes stories for her own amusement. She occasionally serves as a baby-sitter, but otherwise does not work after school. She helps



at home and cares for the garden and the family pet. She is greatly interested in outdoor sports and is a former member of the Community House and the girl scouts. This girl attends parties and dances, plays indoor games, solves puzzles, studies nature, and goes to church.

Pupil's associates.-- Her associates are boys and girls who are older than herself. She was vice-president of a group of girls.

Future plans.-- After thinking about her future, she has decided to complete her high-school education. She is encouraged in this by her parents. Following graduation from high school, she intends to enter a nursing school and prepare herself for a career as a nurse.

### Case C

Case C is classified in intelligence-quotient group II, because he has an intelligence quotient of 122. He has an aggregate numerical achievement of 173 and is classified in achievement group IV. He is enrolled in the college course.

Census data.-- This boy entered grade nine at the age of 13 years and 9 months. He was born in an adjacent community, but he attended school in this town.

Health and physical data.-- He is 64½ inches tall and weighs 128 pounds. He has had only the usual child-



11 4 5 6 7 8  
A. B. C. D. E. F. G. H. I. J. K. L. M. N. O. P. Q. R. S. T. U. V. W. X. Y. Z.

hood diseases and is free from physical defects. He is average in personal neatness.

Immediate family.-- His parents are alive but are divorced. They were born in this country and received a high-school education. He lives with his mother and step-father. The latter is employed as a paper maker. He has no siblings.

Mental data.-- At the time he entered grade nine, the following mental data was available on this pupil: mental age of 16 years and 6 months, educational quotient of 116, and a classification index of 120.

Educational history.-- His attitude regarding school is that "there is nothing wrong with it". His favorite subjects are arithmetic and geography, because they "came easy". He most dislikes Latin and English. The latter is his most-difficult subject. He does not worry about his school marks.

He entered grade one at the age of 5 years and 9 months after completing one year of kindergarten. He has neither repeated any grades nor been absent for 10 per cent or more of the scheduled school sessions during any year. He seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:





|                               |    |
|-------------------------------|----|
| Social Science Background     | 90 |
| Correctness in Writing        | 87 |
| Natural Science Background    | 91 |
| Quantitative Thinking         | 65 |
| Reading Social Science        | 82 |
| Reading Natural Science       | 85 |
| Reading Literature            | 80 |
| General Vocabulary            | 81 |
| Use of Sources of Information | 85 |

His grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 10.3 in reading, 9.0 in language usage, and 7.0 in spelling.

His junior-high-school teachers noted that he was a consistently good worker and that he had a strong interest in science. His science marks were A in grade seven and B- in grade eight.

The average marks for the first half-year which he received in other grade-nine subjects were B in history, physical education, and drawing; C in algebra, and C- in English and latin. He carried a load of 24 diploma credits in grade nine.

Study habits.-- This pupil does not make notations of his assignments, but he understands what he is to do. He does not study regularly. At the times he studies, he does so alone and completes his work; but he neither uses reference books nor makes notations of facts to remember. He promptly makes up work missed due to absence and does assignments in subjects which he dislikes. He seldom reviews studies previously covered and does not read ahead



of his assignments.

Behavior characteristics.-- His teachers note that this boy has a good mind and could show much better achievement. He has a tendency to clown in class. His grade-line conduct was good.

He was rated by his grade-line teachers as satisfactory in the following traits: emotional control, social habits, accuracy, school adjustment, attitudes, leadership, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in initiative and industry.

Environment.-- His family owns a four-room house in a poor neighborhood which is occupied by three persons. They possess about 150 books. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil's outside reading is confined to newspapers. He does not work after school, but he has worked in a laboratory. He helps at home and aids with the garden and the pet. He engages in outdoor sports and goes to parties and dances. He goes to church. This boy likes to write compositions and to fix objects in need of repair. He has no interests in puzzle solving, nature study, indoor games, collection, veraplocks, music, or art.

Pupil's associates.-- He associates with boys and



girls who are older than himself. He has never been a leader of a group.

Future plans.-- He has not thought about his future and has made no definite plans about his post-high-school education or his career. He intends to complete his high-school education and is encouraged in this by his mother and step-father.

#### Case D

Case D has an intelligence quotient of 113 and is classified in intelligence-quotient group II. She has an aggregate numerical achievement of 68 and is classified in achievement group IV. She is taking a commercial course.

Census data.-- This girl entered grade nine at the age of 13 years and 4 months. She was born in an adjacent town, but she attended the schools in this town.

Health and physical data.-- She is 55 inches tall and weighs 103½ pounds. She has slight defects of posture and moderate defects of her skin and feet. Her teeth are in poor condition. She is average in personal attributes. This girl has had only the usual childhood diseases.

Immediate family.-- Her parents were born in the United States and are alive, they are separated. Her parents did not receive a high-school education. Her father is an electrician; her mother is at home. She has three siblings.

Mental data.-- The following mental data was avail-





alls on this pupil: mental age of 13 years and 9 months, educational quotient of 120, and a classification index of 120.

Educational history.-- This girl is not enthusiastic about school attendance. English is her favorite subject. She most dislikes science and history, because she "was not interested in them". The latter is her most-difficult subject. She worries about her school work.

She began school at the age of 5 years and 4 months in grade one. She has not repeated any grades. The attendance record shows that she was absent for 10 per cent or more of the scheduled school sessions during the first, fifth, and eighth grades. She seldom was tardy.

On the Iowa Tests of Educational Development given in grade 6.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 54 |
| Natural Science Background    | 57 |
| Correctness in Writing        | 73 |
| Quantitative Thinking         | 30 |
| Reading Social Science        | 21 |
| Reading Natural Science       | 40 |
| Reading Literature            | 60 |
| General Vocabulary            | 42 |
| Use of Sources of Information | 36 |

Her grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 6.6 in reading, 6.8 in language usage, and 7.9 in spelling.

Her junior-high-school teachers noted that she did not work to the limits of her abilities. She was an un-



tidy worker, but she had good attitudes. Her science marks were C in grade seven and C- in grade eight.

The marks for the first half-year which she received in other grade-nine subjects were B in physical education and English, C in geography, and C- in history and junior business training. She carried a load of 20 diploma credits in grade nine.

Study habits.-- This pupil makes notations of her assignments and understands what she is to do. She neither studies regularly nor completes her assignments. She does not use reference books, nor does she make notations of facts to remember. She is not prompt in making up work missed due to absence. This girl reviews studies previously covered, but she does not study ahead of her assignments.

Behavior characteristics.-- This girl is self-centered and self-conscious. She was rated by her grade-nine teachers as satisfactory in the following traits: emotional control, school adjustment, attitudes, and leadership. She was rated as unsatisfactory in initiative, social habits, accuracy, industry, group participation, self-confidence, and desire to excel.

Environment.-- This girl and her mother board with another family in a good neighborhood. Seven people occupy seven rooms in this house. There are about 150 books



in the house. No foreign language is spoken there.

Interests and leisure activities.-- Pupil enjoys reading library books, newspapers, and comic books. She helps at home and aids with the care of the garden and the family's pet. She takes part in outdoor sports, indoor games and goes to parties and dances. This girl belongs to the Community House, the school glee club, and the girl scouts. She attends church. She has no interests in puzzle solving, nature study, scrapbooks, making things, creative writing, or art. She does not work after school.

Pupil's associates.-- She associates with boys and girls who are both older and younger than herself. Although she has never been the leader of a group, she is very popular.

Future plans.-- This girl has not thought about her future and has no career plans. She intends to complete her high-school education and is encouraged in this by her mother. She does not plan any post-high-school education.

#### Case E

Case E has an intelligence quotient of 115 and is classified in intelligence-quotient group II. She has an aggregate numerical achievement of 215 and is classified in achievement group IV. She is taking a commercial course.





Census data.-- This girl entered grade nine at the age of 13 years and 10 months. She was born in this town and completed her elementary and junior-high schooling in the parochial school in this town.

Health and physical data.-- She is 61½ inches tall and weighs 113½ pounds. She has slight defects of tonsils, adenoids, and glands. She has had only the usual childhood diseases. This girl is above average in personal neatness.

Immediate family.-- Her parents were born in this country and are alive. They received a high-school education. Her father is a police sergeant; her mother is at home. She has four siblings.

Mental data.-- The following mental data was available on this girl when she entered grade nine: mental age of 15 years and 3 months, educational quotient of 107, and a classification index of 111.

Educational history.-- This pupil likes school "a lot". Her favorite subjects are English and spelling. She most dislikes geography and science. Junior Business training is her most-difficult subject. She worries about her school marks and about her parents attitudes regarding her marks.

She entered school at the age of 3 years and 9 months in grade one. She has repeated no grades. The attendance





record shows that she was absent for 10 per cent or more of the scheduled school sessions during all but one of her previous school years. She seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |                                |
|-------------------------------|--------------------------------|
| Social Science Background     | 67                             |
| Natural Science Background    | 13                             |
| Correctness in Writing        | 78                             |
| Quantitative Thinking         | 50                             |
| Reading Social Science        | 33                             |
| Reading Natural Science       | 61                             |
| Reading Literature            | 60                             |
| General Vocabulary            | 73                             |
| Use of Sources of Information | 54 <sup>1</sup> / <sub>2</sub> |

In junior high school, her teachers noted that she did not work to the limit of her abilities. She did not take science in grades seven and eight.

The marks for the first half-year which she received in other grade-nine subjects were B in English, physical education, and cooking and C in history, geography, and junior business training. She carried a load of 22 diploma credits in grade nine.

Study habits.-- This girl makes a notation of her assignments, but she does not always understand what she is to do. She studies regularly with her classmates until her assignments are completed. She uses reference books but makes no notations of facts to remember. She is not prompt in making up work missed due to absence. She

<sup>1</sup>/<sub>2</sub> The records of her results on other achievement tests could not be located.



does homework in subjects which she dislikes, because she "has to"; but she neither reviews studies previously covered nor reads ahead of her assignments.

Behavior characteristics.-- This girl is friendly and pleasant. She was rated by her grade-nine teachers as satisfactory in the following traits: industry, emotional control, social habits, school adjustment, attitudes, leadership, group participation, self-confidence, and desire to excel. She was rated as unsatisfactory in accuracy and initiative.

Environment.-- Her family owns a seven-room house in an excellent neighborhood which is occupied by seven persons. The family possesses at least 300 books. No foreign language is spoken at home.

Interests and leisure activities.-- This pupil's outside reading is limited to newspapers and comic books. She collects records and birthday cards and keeps a scrapbook of pictures and souvenirs. She takes part in outdoor sports and indoor games and attends parties and dances. She is a talented dancer. She is a member of the Community House, girl scouts, school glee club, school cheer team, and drum majorettes. She attends church. This girl helps at home and aids in caring for the garden and her pet. She has no interests in puzzle solving, nature study, or creative writing.



100

Paul's associates.-- Her associates are boys and girls of her own age. She was elected secretary of her grade-nine class and is very popular.

Future plans.-- She has thought about her future. She intends to complete her high-school education and is encouraged in this by her parents. She plans no post-high-school education and intends to seek employment as a telephone operator.

#### Case F

Case F has an intelligence quotient of 110 and is classified in intelligence-quotient group II. He has an aggregate numerical achievement of 153 and is classified in achievement group IV. He is taking the college course.

Census data.-- This boy entered the ninth grade at the age of 13 years and 4 months. He was born in an adjacent town, but he received his schooling in the town in which he now lives.

Health and physical data.-- He is 71 inches tall and weighs 170 pounds. He has had the whooping cough as a child, but he is free from physical defects. He is above average in personal neatness.

Immediate family.-- His father was born in the United States; his mother was born in Scotland. They have received a high-school education and are alive. His father works as a rigger; his mother is at home. He has one bro-





ther.

Mental Data.-- At the time this pupil was in grade nine, the following mental data was available on him: mental age of 11 years and 7 months, educational quotient of 115, and a classification index of 113.

Educational history.-- This boy likes school. His favorite subjects are English and history, because he "enjoys reading". He most dislikes science and geography, because they are not interesting. The latter is his most-difficult subject. He worries about his school marks.

He began school at the age of 5 years and 4 months in grade one. He has repeated no grades. The attendance record shows that he was absent for 10 per cent or more of the school sessions during the first, fourth, sixth, and eighth grades. He seldom was tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 62 |
| Natural Science Background    | 57 |
| Correctness in Writing        | 67 |
| Quantitative Thinking         | 30 |
| Reading Social Science        | 60 |
| Reading Natural Science       | 39 |
| Reading Literature            | 71 |
| General Vocabulary            | 51 |
| Use of Sources of Information | 57 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.3 were 11.3 in reading, 9.6 in language usage, 8.1 in spelling, and 11.8 in arithmetic.



His junior-high-school teachers noted that he was neither a dependable nor a steady worker. His science marks were C- in grade seven and C in grade eight.

The average marks for the first half-year which he received in other grade-nine subjects were B in physical education; C in freehand drawing, English, and history; and C- in algebra. He carried a load of 19 diploma credits in grade nine.

Study habits.-- His study habits are poor in that he makes no notations of his assignments and does not understand what he is to do. He does not study regularly, does not use reference books, nor does he make notations of facts to remember. He does not make up work missed due to absence promptly and does not do homework in subjects which he dislikes. He neither reviews studies previously covered nor study ahead of his assignments. At the times he studies, he does so with some of his classmates, but he does not complete his assignments.

Behavior characteristics.-- This boy is boisterous and loud and is loathe to work in the ninth grade. He was rated by his grade-nine teachers as satisfactory in the following traits: leadership, group participation, and self-confidence. He was rated as unsatisfactory in emotional control, industry, social habits, accuracy, school



adjustment, attitudes, and initiative.

Environment.-- His family rents six-room living quarters in a good neighborhood which is occupied by four persons. About 25 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- His outside reading is usually restricted to newspapers and comic books. He is greatly interested in sports and has played on the school sports teams. He maintains a baseball scrapbook. He has slight interests in singing and drawing. He attends church and goes to parties and dances. He is a member of the Community House. He takes part in indoor games and likes to fix and make things. He helps at home, but he does not work after school. He has no interests in puzzle solving and in nature study.

Pupil's associates.-- He associates with boys and girls who are older than himself. He is very popular and has been the leader of a group.

Future plans.-- This boy intends to complete his high-school education and is encouraged in this by his parents. Although he has no definite plans for the future, he is considering the field of sports. He does not plan to obtain post-high-school education.



Case 11 has an intelligence quotient of 111 and is classified in intelligence-percent group II. He has an aggregate numerical achievement of 104 and is classified in achievement group IV. He is enrolled in the commercial course.

Census data.-- When he entered grade nine, this boy was 15 years and 5 months old. He was born and received his previous schooling in this town.

Health and physical data.-- He is 60 inches tall and weighs 110 pounds. He had a very mild case of infantile paralysis in addition to the usual childhood diseases. He is free from physical defects. He is average in personal neatness.

Immediate family.-- His parents were born in this country and are alive. They have received a high-school education. His parents are divorced, and his mother has recently remarried. He is living with his mother and stepfather. His stepfather is employed as a mechanic; his mother works in a factory. He has three siblings.

Mental data.-- The following mental data was available on this boy when he began grade nine: Chronological age of 15 years and 1 month, educational quotient of 107, and a classification index of 103.

Educational history.-- In the classroom this boy has never measured up to his tested abilities. He has an in-





different attitude about school attendance. Mathematics and English are his favorite subjects. He most dislikes geography and science, because they "are hard to understand". The latter is his most-difficult subject. He worries about his school marks.

He began school at the age of 5 years and 3 months in grade one. He has repeated no grades. The attendance record shows that he was absent for 10 per cent or more of the school sessions during the fourth, sixth, seventh, and eighth grades. He seldom was tardy.

On the Iowa Test of Educational Development given in grade 8.0, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 39 |
| Natural Science Background    | 31 |
| Correctness in Writing        | 55 |
| Quantitative Thinking         | 25 |
| Reading Social Science        | 39 |
| Reading Natural Science       | 30 |
| Reading Literature            | 22 |
| General Vocabulary            | 32 |
| Use of Sources of Information | 15 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.0 were 11.0 in reading, 8.6 in language usage, 10.5 in spelling, and 6.4 in arithmetic.

His junior-high-school teachers felt that his personality traits retarded his achievement in that he was lazy. His science marks were C in grade seven and B in grade eight.

The average marks for the first half-year which he



received in other grade-nine subjects were B in history, physical education, and music appreciation; C in English and geography, and D in junior business training. He carried a load of 25 1/2 diploma credits in grade nine.

Study habits.-- The writer has observed this pupil in the study halls and in the classroom and noted that this boy seems physically and mentally unable to sit still. He makes any excuse to walk around the room. He taps his pencil and shuffles his feet and often doesn't realize that he is disturbing others.

He states that he makes notations of his assignments "most of the time", but that he does not always understand what he is to do. He does not study regularly. At the times he studies, he does so alone, makes use of reference books, makes notations of facts to remember, and completes his assignments. He makes up work missed due to absence promptly. He sometimes reviews work previously studied and reads ahead of his assignments.

Behavior characteristics.-- This boy is immature and unsettled. He has little self-control, a tendency to clown, and very poor classroom manners.

His grade-nine teachers rated him as satisfactory in the following traits: attitudes, group participation, and self-confidence. He was rated as unsatisfactory in industry, emotional control, social habits, accuracy, ini-



tiative, school adjustment, leadership, and desire to excel.

Environment.-- His family rents an eight-room house in an excellent neighborhood which is occupied by seven persons. They have about 250 books at home. No foreign language is spoken at home.

Interests and leisure activities.-- He has great interests in music. He is a member of the school band, orchestra, and boys glee club; and was an active solicitor for funds to purchase new uniforms for the school band. He reads library books and newspapers, collects stamps, keeps a scrapbook of newspaper clippings, builds model airplanes, and draws. He engages in indoor games, outdoor sports, and puzzle solving. This boy helps at home and helps with the garden, but he does not work after school. He goes to church and attends parties and dances.

Friend's associates.-- His associates are boys and girls of his own age. He was the leader of a group.

Future plans.-- This boy intends to complete his high-school education and is encouraged in this by his mother. After being graduated from high school, he plans to attend a school of theology and to enter the ministry.

## Case II

Case II has an intelligence quotient of 111 and is





classified in intelligence-quotient group II. He has an aggregate numerical achievement of 151 and is classified in achievement group IV. This pupil is taking the college course.

Census data.-- This boy was 15 years and 6 months old when he entered grade nine. He was born in a neighboring state and attended several elementary schools. He attended junior high school in this town.

Health and physical data.-- He is 66½ inches tall and weighs 115 pounds. He has a pre-systolic heart murmur, defective tonsils and adenoids, and a slight skin eruption. This boy is below average in personal neatness.

Immediate family.-- His parents were born in this country and are alive. They did not receive a high-school education. His parents are divorced. He lives with his mother who is employed as a waitress. He has one brother.

Mental data.-- At the time this pupil entered grade nine, the following mental data was available on him: mental age of 10 years and 4 months, educational quotient of 112, and a classification index of 112.

Educational history.-- This boy dislikes school and would not have attended if he were not compelled to do so. He did not like any of his school work. He finds science his hardest subject. He worries about his school marks.

He began school at the age of 5 years and 6 months in



grade one. He repeated grades two and three. The records of his attendance and tardiness could not be located.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 67 |
| Natural Science Background    | 60 |
| Correctness in Writing        | 55 |
| Quantitative Thinking         | 30 |
| Reading Social Science        | 45 |
| Reading Natural Science       | 10 |
| Reading Literature            | 34 |
| General Vocabulary            | 76 |
| Use of Sources of Information | 55 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.9 were 9.6 in reading, 8.3 in language usage, 7.9 in spelling, and 11.3 in arithmetic.

His junior-high-school teachers noted that he had abilities, but that he did not make use of them. His science marks were C- in grades seven and eight.

The average marks for the first half-year which he received in other grade-nine subjects were B in physical education, C in history and English, and C- in algebra. He dropped out of the latin class after the start of the school year. He carried a load of 13 diploma credits in grade nine.

Study habits.-- This boy did not take the trouble to study. He reads his school books for want of something to do. He rarely could be encouraged to take part in class activities in science. At the times he did any work, he



does so alone, but he does not complete his assignments. He does not make up work which he missed due to absence, nor does he do assignments in subjects which he dislikes.

Behavior characteristics.-- This pupil is moody and appears unhappy. He is disinterested in school undertakings. In junior high school, he disliked being in the same class with his younger brother who was immature in appearance and behavior. He gets along well with his classmates.

His grade-nine teachers rated him as satisfactory in the following traits: social habits and school adjustment. He was rated as unsatisfactory in industry, emotional control, accuracy, attitudes, initiative, leadership, group participation, self-confidence, and desire to excel.

Environment.-- His family owns a six-room house in a good neighborhood which is occupied by four persons. About 50 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This boy reads newspapers and comic books. He engages in outdoor sports, indoor games, and puzzle solving. He collects pictures. He attends church and goes to the Community House, parties, and dances. He does not work after school nor help at home. He has no interests in music, art, creative writing,



or mature study.

Peer relationships.-- This subject has two boys and girls of his own age. He has never been the leader of a group, but he is very popular with his classmates.

Future plans.-- His future plans are in a state of flux. He neither knows whether he will complete his high-school education or what he desires to do when he leaves school.

#### Case I

Case I has an intelligence quotient of 111 and is classified in intelligence-maturity group II. He has an aggregate historical achievement of 116 and is classified in achievement group IV. He is taking a college course.

Census data.-- At the time this boy entered grade nine, he was 13 years and 7 months old. He was born in an adjacent community, but he attended the schools in this town.

Health and physical data.-- He is 59½ inches tall and weighs 100 pounds. He has slight enlargement of his glands, speech, teeth, tonsils, and adenoids. He has had only the usual childhood diseases. He is above average in personal neatness.

Mental data.-- The following mental data was available on this pupil when he entered grade nine: mental age of 14 years and 11 months, class vocal quotient of 121,





and a classification index of 115.

Immediate Family.-- His parents were born in the United States and are alive. They did not receive a high-school education. His father is employed as a carpenter; his mother is at home. He has seven siblings.

Educational history.-- This pupil likes school. Mathematics and reading are his favorite subjects, because they were "interesting". He most dislikes spelling and English. The latter is his most-difficult subject. He worries about his school marks.

He began school at the age of 5 years and 4 months in grade one. He has not repeated any grades. The attendance record shows that he was absent for 10 per cent or more of the school sessions only during grade two. He seldom was tardy.

This boy was absent at the time the Iowa Tests of Educational Development were given. His grade equivalents on the Stanford-Binet Development Tests given in grade 7.0 were 4.2 in reading, 3.1 in language usage, and 3.3 in spelling.

His junior-high-school teachers noted that he had the capabilities to be a better student. His science marks were B in grades seven and eight.

The average marks for the first half-year which he obtained in other grade-nine subjects were B in algebra, physical education, and freedom drawing; and C in English,



Latin, and History. He carried 100% of 24 diploma credits in grade nine.

Study habits.-- He makes notations of his assignments and understands what he is to do. He "usually" does his assignments regularly by himself until they are completed. While studying, he refers to reference books and makes notations of facts to remember. This boy does not make up work missed due to absence promptly, but he does homework in subjects which he dislikes. Although he does not review subjects previously studied, he runs ahead of his assignments.

Behavior characteristics.-- This boy has used foul language in school and has been untruthful and unreliable. He broke a school rule by leaving the school grounds during recess. This boy wanders through the school corridors whenever possible. He states that he worries about "everything".

His grade-nine teachers rated him as satisfactory in the following traits: leadership, group participation, self-confidence, and desire to excel. He was rated as unsatisfactory in industry, emotional control, social habits, accuracy, school adjustment, attitudes, and initiative.

Environment.-- His family owns a seven-room house in a good neighborhood which is occupied by ten persons. About 300 books are possessed by the family. No foreign language



is spoken at home.

Interests and leisure activities.-- This pupil is greatly interested in sports. He is a member of the school sports teams. His junior-high-school teachers are felt that his sports interests may interfere with his scholastic achievement. He reads library books, newspapers, and comic books. He plays the bugle, draws, and is a member of the school dramatic club. He engages in outdoor sports, indoor games, and puzzle solving; attends church and the Community House; and goes to parties and dances. He works after school and helps at home with the care of the garden. He also fixes objects in need of repair. This boy has no interests in collections, scrapbooks, or nature study.

Pupil's associates.-- His associates are boys and girls who are older than himself. He is president of his class in school and president of a club of boys. He is very popular with other pupils.

Future plans.-- He has thought about his future and plans to complete his high-school education. His parents encourage him in this. On being graduated from high school, he plans to attend college and study architecture. His is interested in pursuing a career in either architecture or in sports.

#### Case J

Case J has an intelligence quotient of 111 and is





classified in intelligence quotient group II. His aggregate numerical achievement of 157 results in his classification in achievement group IV. He is taking a general course.

Census data.-- When he entered grade nine, this boy was 14 years old. He was born in an adjacent community, but he attended the schools of this town.

Health and physical data.-- He is 57 inches tall and weighs 75½ pounds. His teeth are slightly defective, but he is free from defects of vision, hearing, and speech. He has had only the usual childhood diseases. He is above average in personal neatness.

Immediate family.-- His parents were born in the United States and are alive. His father received a high school education and is employed as a mason; his mother is at home. His parents have been uncooperative in working with the school. He has five siblings.

Mental data.-- The following mental data was available on this pupil when he began grade nine: mental age of 15 years and 2 months, educational quotient of 115, and a classification index of 107.

Educational history.-- This pupil has an indifferent attitude about school attendance. History is his favorite subject, because it "holds my interest". English and mathematics are his most-difficult subject. He worries



about his school marks.

He began school at the age of 6 years in grade one. He has repeated no grades. The attendance record shows that he was absent for 10 per cent or more of the school sessions during grades four and eight. He seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 54 |
| Natural Science Background    | 37 |
| Correctness in Writing        | 29 |
| Quantitative Thinking         | 39 |
| Reading Social Science        | 45 |
| Reading Natural Science       | 75 |
| Reading Literature            | 40 |
| General Vocabulary            | 51 |
| Use of Sources of Information | 21 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.9 were 11.2 in reading, 9.9 in language usage, 9.9 in spelling, and 6.3 in arithmetic.

His junior-high-school teachers noted that he was inattentive and that he lacked the ability to concentrate. His science marks were C- in grade seven and C in grade eight.

The average marks for the first half-year which he obtained in eighth-grade subjects were D in physical education, C in history, C- in English, and D in mathematics. He dropped mechanical drawing after the start of the year. He carried a load of 20 diploma credits in



Grade Nine.

Study habits.-- This pupil takes notations of his assignments, but he is not always sure what he is to do. He does not study regularly. At the times he studies, he does so alone and completes his work. He makes no use of reference books, nor does he take notations of facts to remember. He is not always prompt in turning up work assigned him to absence. He does homework in subjects he dislikes, reviews studies previously covered and reads ahead of his assignments.

Behavior characteristics.-- This boy is nervous and immature. He feels insecure in school, lacks initiative, and resents criticism. His grade-nine conduct was excellent.

His grade-nine teachers rated him as satisfactory in the following traits: emotional control, social habits, school adjustment, attitudes, group participation, and desire to excel. He was rated as unsatisfactory in industry, accuracy, initiative, leadership, and self-confidence.

Environment.-- His family owns an eight-room house in a good neighborhood which is occupied by eight persons. About 100 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This boy reads



widely. He has a gun collection, engages in outdoor sports, and is interested in puzzle solving and nature study. He attends church and goes to parties, but he does not attend dances. He has been a boy scout. He works after school, helps at home, and cares for his dog. He has no interests in collections, music, art, or creative writing.

Facile's associates.-- This boy associates only with boys of his own age. He does not go with girls. He has never been the leader of a group.

Future plans.-- He has thought about his career and intends to make his career in the field of sports. He desires to finish his high-school education and is encouraged in this by his parents. He plans no post high-school training.

#### Case K

An intelligence quotient of 111 results in the classification of case K in intelligence-quotient group II. She has an aggregate numerical achievement of 136. She is classified in achievement group IV. She is enrolled in the commercial course.

Census data.-- At the time this girl entered grade nine, she was 18 years and 5 months old. She was born and received her previous schooling in this town.

Health and physical data.-- She is 60 inches tall and weighs 99 pounds. She has had only the usual child-





head diseases. She has slight defects of lungs, tonsils, adenoids, prostate, etc., and, etc. She wears glasses to correct a visual defect. This girl is above average in headness.

Immediate family.-- Her parents were born in the United States and are alive. They did not receive a high-school education. Her father is a carpenter; her mother is at home. She has four siblings.

Mental data.-- The following mental data was available on this girl when she began the test: mental age of 14 years and 6 months, educational quotient of 100, and a classification index of 100.

Educational history.-- She was "glad she could go" to school. There are no subjects which she likes. She most-likes science and mathematics. The latter is her most-difficult subject, because it is "too complicated". Her only school worry comes when she has to prepare a oral composition.

She began school at the age of 5 years and 5 months in grade one. She repeated no grades. The attendance record shows that she was absent for 10 per cent or more of the sessions during grades one, three, four, seven, and eight. She seldom was tardy.

On the Iowa Tests of Educational Development given in grade 8.1, she ranked in the following percentiles:



|                               |    |
|-------------------------------|----|
| Social Science Dictionary     | 54 |
| Natural Science Back Form     | 57 |
| Correctness in Writing        | 73 |
| Quantitative Thinking         | 51 |
| Reading Social Science        | 60 |
| Reading Natural Science       | 61 |
| Reading Literature            | 26 |
| General Vocabulary            | 58 |
| Use of Sources of Information | 29 |

Her grade equivalents on the Stanford Achievement Tests given in grade 5.8 were 9.4 in reading, 11 in language usage, 11.3 in spelling, and 7.3 in arithmetic.

Her junior-high-school teachers noted that she lacks effort and determination and that she was not too co-operative. Her science marks were C- in grade seven and C in grade eight.

The average marks for the first half-year when she received in other grade-nine subjects were B in English and junior calculus training; and C in history, geography, and physical education. She carried a load of 20 diploma credits in grade nine.

Study habits.-- Pupil makes notations of her assignments, but she does not always understand what she is to do. She does not always complete her work, nor study regularly. At the times she studies, she uses by alone, uses reference books, and makes notations of facts to remember in subjects other than science. She does not make up work missed due to absence, nor does she do extra work in subjects which she dislikes. She only oc-



cheerfully, and in 1937, 1938, and 1939. As observed of the child in the school story telling, this girl is constantly busy with school work.

Behavior characteristics.-- This girl is shy and does not care to cooperate with her teachers in improving her work. Her conduct in grade nine was excellent.

She was rated by her grade-nine teachers as satisfactory in the following areas: 1. Memory, intellectual control, social initiative, school day behavior, attitude and group participation. She was rated as unsatisfactory in accuracy, initiative, leadership, self-confidence, and desire to excel.

Environment.-- Her family owns seven-room living quarters in a fair neighborhood which is occupied by seven persons. About 100 books are owned by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This girl has great many responsibilities. She plays the piano and reads the newspapers. She attends church and goes to parties and dances. She engages in outdoor sports. She has no interest in puzzle solving, indoor games, nature study, creative writing, or art.

Family's associates.-- She associates with girls who are older than herself. She does not go with boys. This girl has never been the leader of a group.





Future plans.-- This pupil plans to complete her high-school education and is encouraged in this by her parents. She does not intend to secure any post high-school training nor to seek a job. She prefers to stay at home until she can find a husband to marry.

#### Case L

Case L is classified in intelligence-quotient group II, because he has an intelligence quotient of III. He has an aggregate merical achievement of 111 and is classified in achievement group IV. This pupil is taking the commercial course.

Conce data.-- At the time he entered the fourth grade, this boy was 10 years and 3 months old. He was born and received his previous schooling in this town.

Health and physical data.-- He is 50 inches tall and weighs 113 pounds. He has had only the usual childhood diseases and is free from physical defects. He is above average in personal characteristics.

Immediate family.-- His father was born in Italy and his mother is native-born. Both of his parents are alive. They have not received a high-school education. His parents are divorced and he lives with his mother, who is at home. He has 2 siblings.

Mental data.-- The following mental data was available on this pupil when he began grade four: mental age



of 11 years and 10 months, educational quotient of 110, and a classification index of 110.

Educational history.-- This pupil did not like school and would not have attended if he were not compelled to do so. His favorite subjects are mathematics and history. He most dislikes geography and English. The latter is his most-difficult subject. He worries about his school marks.

He began school at the age of 5 years and 6 months in grade one. He has repeated no grades. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions during the fifth, sixth, and seventh grades. He seldom has been tardy.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 60 |
| Natural Science Background    | 80 |
| Correctness in Writing        | 61 |
| Quantitative Thinking         | 44 |
| Reading Social Science        | 45 |
| Reading Natural Science       | 24 |
| Reading Literature            | 40 |
| General Vocabulary            | 32 |
| Use of Sources of Information | 42 |

His grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 7.3 in reading, 6.6 in language usage, and 6.7 in spelling.

His junior-high-school teachers noted that he lacks stability, and that he does not work up to his abilities.



his science marks were B in grade seven and C in grade eight.

The average marks obtained by him in other grade-nine subjects were B in physical education, geography, junior business training, and freehand drawing and C in English and history. He carried a load of 21 diploma credits in grade nine.

Study habits.-- This pupil does not make notations of his assignments, but understands what he is to do. He does not study regularly. At the times he studies, he does so alone and "quits when tired", makes no use of reference books and makes no notations of facts to remember. He neither makes up work missed due to absence promptly, nor does homework in subjects which he dislikes. Although he reviews studies previously covered, he does not read ahead of his assignments.

Behavior characteristics.-- His junior-high-school teachers noted that he wished to be helpful, but that he lacked stability. He stated that he "worries about everything". One teacher noted that he is lazy and has passed up opportunities to work after school. His grade-nine conduct was poor.

His grade-nine teachers rated him as satisfactory in the following traits: attitudes, leadership, group participation, and self-confidence. He was rated as



unstable story, in industry, emotional control, social habits, accuracy, school adjustment, initiative, and desire to excel.

Environment.-- His family rents three-room living quarters in a good neighborhood which are occupied by three persons. About 100 books are owned by the family. No foreign language is spoken at home.

Interests and leisure activities. This boy reads newspapers and comic books. He collects baseball pictures, engages in outdoor sports, and plays indoor games. He helps at home and aids with the care of the garden. He has no interests in puzzle solving, nature study, music, art, creative writing, or making objects. He does not go to church, the Community House, parties, or dances.

Family's associates.-- His associates are boys who are older than himself. He does not go with girls. He has never been a leader of a group.

Future plans.-- This pupil intends to complete his high-school education and is encouraged in this by his mother. He has not thought about his future, but he does not plan to obtain post high-school training. He doesn't know what he will do when he leaves high school.

#### Case L

Case L has an intelligence quotient of 110 and is classified in intelligence-quotient group II. She was





an aggregate numerical achievement of 150 and is classified in achievement group IV. She is enrolled in the Commercial course.

General data.-- At the time she entered grade nine, this girl was 15 years and 8 months old. She was born and reared in this town.

Health and physical data.-- She is 62 inches tall and weighs 113 pounds. She has slight defects of posture and teeth, and is free from defects of speech, hearing, and vision. She has had only the usual childhood diseases. This girl is below average in personal neatness.

Immediate family.-- Her father was born in this country; her mother was born in Italy. Her father received a high-school education and is employed as a carpenter. Her mother is at home. She has three siblings.

School data.-- The following mental data was available on this girl when she began grade nine: mental age of 11 years and 10 months, educational quotient of 100, and a classification index of 100.

Educational history.-- This girl's high school attendance is "necessary". The subjects that she likes best are history and English, because "they are interesting". Geography and mathematics are her most disliked subjects. The latter is the subject which she finds the hardest. She does not worry about her school work.



She began school at the age of 3 years and 6 months in grade one. She has not repeated any grades. Her attendance record shows that she was absent for 10 per cent or more of the scheduled school sessions during the second, fourth, and seventh grades. She seldom was tardy.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 17 |
| Natural Science Background    | 22 |
| Correctness in Writing        | 48 |
| Quantitative Thinking         | 69 |
| Reading Social Science        | 45 |
| Reading Natural Science       | 24 |
| Reading Literature            | 14 |
| General Vocabulary            | 32 |
| Use of Sources of Information | 29 |

Her grade equivalents on the Stanford Achievement Tests given in grade 8.9 were 7.7 in reading, 9.2 in language usage, 7.7 in spelling, and 7.7 in arithmetic.

Her junior-high-school teachers reported the quality of her work did not measure up to her tested abilities. Her science marks were C- in grades seven and eight.

The average marks for the first half-year which she obtained in other grade-eight subjects were B in physical education, C in history and civics, C- in English and junior business training, and D in geography. She carried a load of 34 diploma credits in grade nine.

Study Habits.-- This pupil earned a written notation of



her assignments, but she does not always understand what she is to do. She neither studies regularly nor completes her work at the assigned studies. She does not use a reference book in a proper way and sometimes of facts to be remembered. When she handles her work by herself. She promptly makes a work record due to absence and does homework in the subjects which she dislikes. Although she reviews material previously covered, she does not read ahead in her assignments.

Behavior characteristics.-- This girl is nervous, shy, self-conscious, and a bit content. Her gross-line conduct was good.

She was rated by her gross-line teachers as satisfactory in social habits and school adjustment. She was rated as unsatisfactory in the following traits: industry, emotional control, accuracy, attitudes, initiative, leadership, group participation, self-confidence, and desire to excel.

Environment.-- Her parents own a five-room house in a good neighborhood which is occupied by six persons. The family possesses about 100 books. No foreign language is spoken at home.

Interests and leisure activities.-- This girl enjoys reading and reads library books, newspapers, and comic books. She is talented in the writing of poetry.





She helps at home and aids in caring for the garden and her pets. She engages in outdoor sports, indoor games, and puzzle solving. This pupil attends church and goes to parties and dances. She was a member of the girl scouts. She does not work after school. This girl has no interests in collections, scrapbooks, nature study, music, art, or fixing and mending of things.

Pupil's associates.-- This girl associates with boys and girls of her own age. She states that she was a leader of a group of girls. Neither her junior-high-school teachers nor her grade-nine teachers feel that she is a leader.

Future plans.-- She plans to complete her high-school education and is encouraged in this by her parents. She does not know whether she will obtain any post high-school training nor what she will do when she is graduated from high school.

#### Case II

Case II has an intelligence quotient of 100 and is classified in intelligence-quotient group III. He has an aggregate numerical achievement of 100 and is classified in achievement group V. He is taking a commercial course.

Census data.-- This boy entered the fifth grade at the age of 10 years and 6 months. He was born and went



to school in this town.

Health and physical data.-- He is 51 1/2 inches tall and weighs 101 pounds. He has had only the usual childhood diseases. His teeth are greatly deteriorated due to neglect, and he has a slight speech defect. He is below average in personal neatness.

Immediate family.-- His parents were born in the United States and are alive. His father received a college education and is employed as an accountant. <sup>1/</sup>His mother received a high-school education and is at home. He has two siblings.

Mental data.-- At the time he began grade nine, the following mental data was available on this pupil: mental age of 14 years and 5 months, educational quotient of 104, and a classification index of 106.

Educational history.-- This pupil has an indifferent attitude about school attendance. English and arithmetic are his favorite subject. He does not dislike history which he states is his most-difficult subject. He worries about his school marks.

Pupil received no previous schooling at the time he entered grade one at the age of 5 years and 6 months. He has repeated no grades. The attendance record shows

1/At the end of this pupil's ninth year in school, his father lost his job because of the excessive use of intoxicants. The family is now living at the town poor farm.



that he was absent for 10 per cent or more of the scheduled school sessions during grades one, two, four, six, and seven. He occasionally has been tardy.

On the Iowa Tests of Educational Development given in grade 8.5, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 11 |
| Natural Science Background    | 22 |
| Correctness in Writing        | 20 |
| Quantitative Thinking         | 3  |
| Reading Social Science        | 60 |
| Reading Natural Science       | 40 |
| Reading Literature            | 54 |
| General Vocabulary            | 42 |
| Use of Sources of Information | 21 |

His grade equivalents on the Stanford Achievement Tests could not be located.

His junior-high-school teachers noted that he had little scholastic ability, but that he did the best work of which he was capable. His science marks were C- in grades seven and eight.

The average marks for the first half-year which he obtained in other grade-nine subjects were D in free-hand drawing and physical education, C in English, C- in history and geography, and D in junior business training.

Study habits.-- pupil makes notations of his assignments but does not always understand what he is to do. He studies regularly by himself until his assignments are completed. He makes use of reference books and while studying makes notations of facts to remember.



He does not make up work missed due to absence promptly, but he does assignments in subject work as it comes.

Behavior characteristics.-- This boy has a record of truancy and has been apprehended stealing. He has cooperated with his teachers in school.

His grade-five teachers rated him as satisfactory in group participation and self-confidence. He was rated as unsatisfactory in the following traits: industry, emotional control, social habits, accuracy, school adjustment, attitudes, leadership, and desire to excel.

Environment.-- Pupil's family rents three-room living quarters in an excellent neighborhood which are occupied by five persons. About fifteen books are owned by the family. No foreign language is spoken at home.

Interests and leisure activities.-- He reads library books, newspapers, and comic books. He used to play a musical instrument. He does a little woodworking, draws and paints, writes stories, and collects types of wood and stones. He engages in outdoor sports, indoor games, studies nature, belongs to the boy scouts, and is a member of the school golf team. He attends church, but he does not go to parties or dances. Although he does not work after school, he helps at home.

Pupil's associates.-- He associates with boys of his own age. He does not go with girls. He has never been





a leader of a group.

Future plans.-- This boy does not intend to complete high school, because he feels that he cannot do the work. He would like to attend a trade school and is interested in securing any out-of-doors work.

#### Case C

Case C has an intelligence quotient of 100 and is classified in intelligence-potential group III. He has an aggregate numerical achievement of 103 and is classified in achievement group V. He is taking a general course.

Consensus data.-- At the time he began grade nine, this boy was 15 years and 11 months old. He was born and received his schooling in the town where he now lives.

Health and physical data.-- He has had much illness due to infantile paralysis. He visits a clinic for treatment after school and walks with a slight limp. He has slight defects of his teeth and speech. This boy is 55½ inches tall and weighs 100 pounds.

Immediate family.-- His parents were born in Ireland and did not receive a high-school education. They are alive. His father is employed as a truck driver; his mother is at home. He has three siblings.

Mental data.-- The following mental data was available on this boy when he entered grade nine: mental age of 14 years and 6 months, educational quotient of 104,



and a classification index of 108.

Educational history.-- He has an indifferent attitude about school attendance. His favorite subjects are mathematics and history, because they are "simple". Two subjects which he most dislikes are geography and English. The latter is his most-difficult subject, because he "can't understand parts of speech". He worries "a little" about his marks in school.

Pupil began school at the age of 5 years and 9 months in grade one. He repeated grade four. The attendance records show that he was absent for the greater part of the fourth grade. He was absent for 10 per cent or more of the scheduled school sessions during grades three, four (repeat year), and eight. He seldom was tardy.

On the Iowa Tests of Educational Development given in grade 8.0, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 54 |
| Natural Science Background    | 60 |
| Correctness in Writing        | 55 |
| Quantitative Reasoning        | 31 |
| Reading Social Science        | 21 |
| Reading Natural Science       | 55 |
| Reading Literature            | 26 |
| General Vocabulary            | 20 |
| Use of Sources of Information | 10 |

His grade equivalents on the Stanford Achievement Tests given in grade 8.0 were 7.0 in reading, 54 in language, usage, 6.0 in spelling, and 10.0 in arithmetic.

While in junior high school, his teachers felt that



he worked to his best abilities. His work was above average in neatness and completeness. His study habits were B- in grade seven, and C- in grade eight.

The average grade for the first-half year which he received in other grade-nine subjects were B in physical education, C in mathematics and shop, C- in English and history. He carried a load of 32 diploma credits in grade nine.

Study habits.-- This pupil has a realistic view of his assignments "most of the time", but only understands that he is to do "half of the job". He studies regularly by himself, but he does not study until he completes his assignments. He makes little use of reference books, and does not make compilations of facts to refer to. He promptly makes up work missed due to absence, but he does not do homework in subjects which he dislikes. He does not review studies previously covered, but he does not read ahead of his assignments. As observed by the writer in the school study habits, this boy does not work steadily at his assignments.

Behavior characteristics.-- This pupil possesses a cheerful and cooperative disposition. In junior high school, his teachers rated him as above average in the following social habits: ability to get along with others, courtesy, acceptance of responsibility, and observance of





school rules. His conduct in grade five was good. Despite his slight physical handicap, he asks for no special considerations from his teachers.

He was rated by his grade-five teachers as satisfactory in the following traits: emotional control, social habits, school adjustment, attitudes, group participation, and self-confidence. He was rated as satisfactory in industry, behavior, initiative, leadership, and desire to excel.

Environment.-- His family lives in a five-room house in a poor neighborhood which is occupied by five persons. About 50 books are possessed by the family. No foreign language is spoken at home.

Interests and leisure activities.-- This boy reads library books, newspapers, and comic books. He does not participate in sports to a great extent, preferring activities such as indoor games and puzzle solving. He enjoys making things in the school shop. He attends parties and dances; however, he was observed on one occasion by the writer at attending a school dance solely for the purpose of watching the proceedings. He attends church. He neither works after school nor helps at home. Nature study, collecting, sports, music, art, and creative writing hold no interests for him.

Pupil's associates.-- He associates with boys who



are closer than himself. He does not associate with girls. He has never been the leader of a group.

Future plans.-- Upon completion of grade nine, he plans to transfer to a public trade school. He is interested in taking a course which shall prepare him for the electrical trade. He is encouraged in these ambitions by his parents. He has no plans for receiving post-trade school education.

#### Case F

Case F has an intelligence quotient of 101 and is classified in intelligence-quotient group III. He is classified in achievement group V, because he has an aggregate numerical achievement of 70. He is enrolled in the general course.

Conduct data.-- This boy entered grade nine at the age of 14 years and 3 months. He was born in an adjacent community, but he attended the schools of this town.

Health and physical data.-- Philip is 62½ inches tall and weighs 113 pounds. He has slight defects of his teeth and feet; but he is free from defects of vision, hearing, and speech. He has had only the usual childhood diseases. He is below average in personal neatness.

Immediate family.-- His parents were born in the United States and are alive. They did not receive a high-school education. His father is employed as a



months; his mother is 37 years old and has two children.

Mental data.-- At the age of 10 years and 3 months, the following mental data was available on this pupil: mental age of 11 years and 3 months, educational quotient of 101, and a classification index of 100.

Educational history.-- He liked school. His favorite subjects are history and science, because they are "easiest". He does not dislike mathematics which he finds to be his most-difficult subject. He "occasionally" worries about his school marks.

This pupil attended kindergarten for seven months before he entered grade one at the age of 5 years and 8 months. He repeated grade two. The attendance record shows that he was absent for 10 per cent of more of the scheduled school sessions only during the fifth grade. He occasionally has been tardy.

On the Iowa Tests of Educational Development given in grade 7.9, he ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 47 |
| Natural Science Background    | 75 |
| Correctness in Writing        | 2  |
| Quantitative Thinking         | 44 |
| Reading Social Science        | 20 |
| Reading Natural Science       | 40 |
| Reading Literature            | 22 |
| General Vocabulary            | 20 |
| Use of Sources of Information | 47 |

His grade equivalences on the Stanford Achievement Tests given in grade 7.9 were 7.3 in reading, 6.4 in language



average, 5.5 in spelling, and 7.1 in arithmetic.

His junior-high-school teachers note that he did not work to the best of his abilities. His science marks were B- in grades seven and eight.

The average marks for the first-half year which he obtained in other grade-nine subjects were B in mechanical drawing and physical education, C in mathematics, and C- in English and history. He carried a load of 20 diploma credits in grade nine.

Study habits.-- This pupil notes that he does not make notations of his assignments, that he does not understand what he is to do, that he does not study regularly, that he makes no use of reference books, that he makes no notations while studying of facts to remember, and that he does not make up work missed due to absence. At times he studies, he does so with other classmates, and he does not complete his assignments, he never reviews studies previously covered.

Behavior characteristics.-- From the start of his school career, he has been self-centered and has lacked self-control. His grade-nine teachers rated him as satisfactory in the following traits: industry, emotional control, social contacts, control of expression, attention, initiative, leadership, group participation, self-confidence, and desire to excel. He was rated as satisfactory in ac-





family.

Environment.-- He is a fairly common eleven-year-old boy in a fair neighborhood who is brought up by his parents, himself, and three brothers. About 200 members are present in the family. He is a fairly average child in appearance.

Interests and leisure activities.-- This pupil reads a lot of books, newspapers, and comic books. He is a collector of coins, engages in outdoor sports, plays indoor games, and occasionally solves puzzles. He is interested in the radio and "talkies" at home in listening to the mechanical objects. He works after school and is a member of the school. He attends church and goes to parties and dances. He has no interests in sports, music, art, or creative writing.

Pupil's associates.-- He is a sociable with boys and girls of his own age. He has never been the leader of a group.

Future plans.-- This boy plans to complete his high-school work and then to go on to college in this or his father. He intends to attend both high-school and college in a high school which will provide him for a position as a policeman.

#### Case 2

Case 2 is an interesting case of a child of 102 and is classified as Intel 1, group-partition, group III. See how



Physical Development. -- This girl is classified as medium-sized. Her height is 5 feet 11 inches. Her weight is 115 pounds. She is well developed and has a good complexion. She is a good swimmer.

General Data. -- This girl entered the fifth grade at the age of 13 years and 5 months. She has been in school for 5 years and 5 months. She has received her previous schooling in this town.

Health and Physical Data. -- She is 5 feet 11 inches tall and weighs 115 pounds. She has brown eyes, brown hair and a fair complexion. She has moderate amounts of her teeth and permanent teeth. This girl is above average in physical development.

Family Data. -- Her parents were born in the United States and are alive. They have received a high-school education. Her father is employed as a foreman; her mother is at home. She has no siblings.

Medical Data. -- At the time she began grade five, the following medical data was available on this pupil: mental age of 13 years and 5 months, educational quotient of 96, and a classification index of 99.

Educational History. -- This pupil likes school. Her favorite subjects are spelling and sewing. Mathematics and history are her next-disliked subjects, because "they are not interesting". The latter is her next-difficult subject. She worries about her school marks.

She entered school at the age of 5 years and 5 months.



in grade 5.9. The attendance record shows that she was absent for 10 per cent or more of the assembled school sessions during grades six, four, six, and eight. She seldom has been tardy. She has repeated 60 grades.

On the Iowa Tests of Educational Development given in grade 8.9, she ranked in the following percentiles:

|                               |    |
|-------------------------------|----|
| Social Science Background     | 3  |
| Natural Science Background    | 37 |
| Correctness in Writing        | 5  |
| Quantitative Thinking         | 13 |
| Reading Social Science        | 13 |
| Reading Natural Science       | 19 |
| Reading Literature            | 16 |
| General Vocabulary            | 11 |
| Use of Sources of Information | 6  |

Her grade equivalents on the Stanford Achievement Tests given in grade 7.9 were 6.2 in reading, 6.6 in language usage, and 6.6 in spelling.

Her junior-high-school teachers noted that she seemed to exert her best effort at all times, but that she did not measure up to her capacities. Her science marks were C in grade seven C- in grade eight.

The average marks for the first half-year which she obtained in other grade-nine subjects were B in physical education; C in English, junior business training, and cooking; C- in history, and D in geography. She carried a load of 35 diploma credits in grade nine.

Study habits.-- This pupil makes notations of her assignments and understated that she is to do. She studies





regularly, usually with another pupil, and completes her assignments. She makes no use of reference books, does not have a collection of facts to remember, and does not have any original ideas or theories. She does some work in subjects which she dislikes, but she neither reviews material previously covered nor studies ahead of her assignments.

Behavior characteristics.-- She has a pleasant appearance. She does not aspire to be a leader in any undertaking. Her grade-nine teachers rated her as satisfactory in the following traits: emotional control, social habits, school adjustment, attitudes, leadership, group participation, and self-confidence. She was rated as unsatisfactory in industry, initiative, accuracy, and desire to excel.

Environment.-- Her family rents four-room living quarters in a fair neighborhood which are occupied by three persons. About 25 books are owned by them. No foreign language is spoken at home.

Interests and leisure activities.-- This girl reads library books, newspapers, and comic books. She keeps a diary, and is a member of the Girl Scouts and the school chess club. She engages in outdoor sports and at times church. She helps around the house, but she does not work after school. She has no interests in indoor games,



puzzles, lawn, water, song, music, art, creative writing, in better form.

Pupil's associates.-- Her associates are boys and girls of her own age. She has never been the leader of a group.

Future plans.-- She intends to complete her high-school education and is encouraged in this by her parents. She has no plans for post high-school education, nor has she decided what she shall do on leaving school.

#### Case R

Case R is classified in intelligence-quotient group III, because he has an intelligence quotient of 93. He had an aggregate numerical achievement of 5 and is classified in achievement group V. He is taking a commercial course.

General data.-- At the time he entered grade nine, this boy was 15 years and 3 months old. He was born and received his schooling in this town.

Health and physical data.-- Pupil is 57 inches tall and weighs 117 pounds. He had a very advanced stage of athlete's foot (pedislocis) when he entered grade nine which distracted his mind from other things. He is greatly below average in personal neatness but is free from physical defects.



Immediate Family.-- His parents were born in this country and are alive. They and now receive a high-school education. His father does not work steadily and is employed as a laborer; his mother is at home. His father is known as a heavy drinker. He has no siblings. None of the children have desired to remain in school.

Mental Data.-- At the time this boy entered grade nine, the following mental data was available on him: mental age of 14 years and 5 months, educational quotient of 82, and a classification index of 91.

Educational History.-- He dislikes school and would not have attended if he were not compelled to do so. He has not lived up to his own stated ability, because of frequent absence. He does not like his school work and has been a consistent truant. His father has been taken to court for refusing to send the boy to school. He does not worry about his school marks.

He received no previous schooling at the time he entered grade one at the age of 5 years and 9 months. He has repeated grades five and seven. The attendance record shows that he was absent for 10 per cent or more of the scheduled school sessions during all but two of his previous school years. He has failed both times.

On the Iowa Tests of Educational Development given in grade 8.9, he ranked in the following percentiles:



|                               |    |
|-------------------------------|----|
| Special Science Background    | 20 |
| Natural Science Background    | 37 |
| General Social Writing        | 23 |
| Quantitative Thinking         | 25 |
| Reading Social Science        | 32 |
| Reading Natural Science       | 24 |
| Reading Literature            | 7  |
| General Vocabulary            | 36 |
| Use of Sources of Information | 5  |

His grade equivalents on the Standard Achievement Tests given in grade 8.0 were 5.2 in reading, 7.2 in language arts, 5.0 in spelling, and 3.0 in arithmetic.

His junior-high-school teacher noted that he needed constant encouragement to do his work. His science marks were C- in grades seven and eight.

He failed all his subjects for the first half-year in grade nine. He was absent for almost half of the school sessions before he left school at the end of the first half-year. He carried a loan of 20 diploma credits in grade nine.

Study habits.-- This pupil did no studying in grade nine. He attended school only because he was forced to do so.

Behavior characteristics.-- His grade-nine teachers had little opportunity to observe his behavior. They noted, however, that he undoubtedly possesses poor personal traits. He is lazy and restless and completely lacks initiative.

Environment.-- His family rents eight-room living-





quarters in a poor section of town. Very few books are owned by the family. No foreign language is spoken at home. The school card reported that the home is a shanties and is very dirty.

Interests and leisure activities.-- He has artistic abilities and likes to draw. He reads newspapers and comic books. He engages in indoor sports and in floor games. He attends church. He has an interest in puzzle solving, nature study, collections, scrapbooks, music, or creative writing. He does not help at home, but he works after school.

Pupil's associates.-- He associates with older boys. He does not go with girls. He has never been a leader of a group.

Future plans.-- This pupil does not intend to continue his schooling beyond his sixteenth birthday. His father desires him to leave school. His plans for the future are to secure work at which he can earn easy money.

#### Case 5

Case 5 has an intelligence quotient of 96 and is classified in intelligence-quotient group III. He has an aggregate numerical achievement of 116 and is classified in achievement group V. He is enrolled in the general course.

Census data.-- This boy entered the ninth grade



at the age of 13 years and 3 months. He has been two  
received his schooling in this year.

Health and physical exam.-- He is 51 1/2 inches tall  
and weighs 123 pounds. He has had only the usual child-  
hood diseases and is free from physical defects. He is  
average in personal neatness.

Immediate family.-- His parents were born in Russia  
and are alive. They did not receive a high-school edu-  
cation. His parents are separated and this pupil lives  
with his mother who is a factory worker. He has no sib-  
lings.

Mental data.-- At the time he began grade nine, the  
following mental data was available on this pupil: mental  
age of 13 years and 11 months, educational quotient of  
51, and a classification index of 39.

Educational history.-- This pupil dislikes school and  
would not attend if he were not compelled to do so. His  
most-dislikes history and English. The latter is his  
hardest subject. He does not worry about his school marks.

He began school at the age of 8 years and 3 months  
in grade one. He repeated grade eight. The attendance re-  
cord shows that he was absent for 10 per cent or more  
of the scheduled school sessions during six of his nine  
previous school years. He was absent for more than 10 per  
cent of the scheduled school sessions during the first



half-year in grade nine. He has not often been very.

On the Iowa Tests of Educational Development given in grade 8.5, he ranked in the following percentiles:

|                                |    |
|--------------------------------|----|
| Social Science Language        | 5  |
| Natural Science Background     | 22 |
| Composition in Writing         | 40 |
| Quantitative Training          | 51 |
| Reading Social Science         | 13 |
| Reading Natural Science        | 49 |
| Reading Literature             | 10 |
| General Vocabulary             | 0  |
| Uses of Sources of Information | 57 |

His grade equivalents on the Stanford Achievement Test given in grade 8.5 were 7.5 in reading; 8.3 in language usage, 7.1 in spelling, and 6.7 in arithmetic.

His junior-high-school teachers noted that he needs constant encouragement in order to do work. His science marks were C- in grades seven and eight.

The average marks for the first half-year which he obtained in other grade-nine subjects were B in physical education, C- in English and mathematics, and D in history. He dropped mechanical drawing after the start of the year. He carried a load of 13 diploma credits in grade nine.

Study habits.-- This boy refuses to do any work. On occasions he would attempt a science test and receive failing or low passing grades for information which he picks up by listening in class.

Behavior characteristics.-- He is very thoughtful





and considerate of his mother. This boy is an smart, professional in connection with a charge of training and entering. He exhibits his delinquent school attitudes by the destruction of paper in the boys lavatory. He has been a truant and will lie to protect himself. He is suspected of being connected with the disappearance of money from school desks and lockers. His parole officer noted that it would be better if the boy were out of school and working.

Environment.-- He and his mother rent four-room living-quarters in a fair neighborhood. They own about 30 books. No foreign language is spoken at home.

Interests and leisure activities.-- Pupil is athletic and enjoys outdoor sports. He reads newspapers and comic books. He plays indoor games and likes to fix mechanical objects. He attends church and goes to parties and dances. He has no interests in puzzle solving, nature study, music, art, or creative writing. He worked after school and helped his mother at home.

Pupil's associates.-- He associates with boys and girls who are older than himself. He has never been a leader of a group.

Future plans.-- He intends to leave school on his sixteenth birthday. He has no plans for further training and plans to secure a job, preferably one requiring



mechanical work.



## CHAPTER IV

### A COMPARISON OF THE SIGNIFICANT CHARACTERISTICS OF THE HIGH ACHIEVERS WITH THOSE OF THE LOW ACHIEVERS

A study of the case histories of the 36 pupils shows that a great number of comparisons can be made between the high achievers and the low achievers.<sup>1/</sup> This chapter presents tables and statistics of such comparisons.

Sex of abnormal achievers.-- About two thirds of the cases are boys. Table 6. shows that of the high achievers, 11 are boys and 6 are girls; of the low achievers, 12 are boys and 7 are girls. Two other comparisons

Table 6. Distribution of Deviates In Terms of Sex and Achievement.

| Type of Deviation | Boys            |                           | Girls           |                            | Total           |                             |
|-------------------|-----------------|---------------------------|-----------------|----------------------------|-----------------|-----------------------------|
|                   | Number of Cases | Per cent of Boys Enrolled | Number of Cases | Per Cent of Girls Enrolled | Number of Cases | Per Cent of Pupils Enrolled |
| (1)               | (2)             | (3)                       | (4)             | (5)                        | (6)             | (7)                         |
| High Achievers    | 11              | 6.0                       | 6               | 3.0                        | 17              | 4.4                         |
| Low Achievers     | 12              | 6.6                       | 7               | 3.5                        | 19              | 5.0                         |
| Total             | 23              | 12.6                      | 13              | 6.5                        | 36              | 9.4                         |

may be made from Table 6. The percentage of deviates in the total boys enrollment is approximately twice the percentage of deviates in the total girls enrollment. Also

<sup>1/</sup> The term high achievers refers to cases whose achievement group is at least two groups higher than their intelligence-quotient group. Similarly, the term low achievers is used to refer to pupils whose achievement group is lower than their intelligence-quotient group.



the percentage of high achievers in the total enrollment is approximately similar to the percentage of low achievers in the total enrollment.

Distribution of deviates in intelligence-quotient groups.-- As seen from Table 7, the percentage of pupils classified in each intelligence-quotient group who show abnormally high achievement decreases as the intelligence-quotient of the group increases. The percentage of pupils classified in each intelligence-quotient group who show low achievement decreases as the intelligence quotient of the group decreases. A greater percentage of the pu-

Table 7. Per Cent of Pupils in Each Intelligence-quotient Group Whose Achievement Deviates by Two or More Groups.

| Intelligence-<br>quotient Group  | Number of Pu-<br>pils in Group | Number of Ca-<br>ses in Group | Per Cent of<br>Cases in Group |
|----------------------------------|--------------------------------|-------------------------------|-------------------------------|
| (1)                              | (2)                            | (3)                           | (4)                           |
| Pupils who Are Positive Deviates |                                |                               |                               |
| V.....                           | 31                             | 7                             | 22.6                          |
| IV.....                          | 88                             | 9                             | 10.4                          |
| III.....                         | 133                            | 1                             | 0.7                           |
| Pupils who Are Negative Deviates |                                |                               |                               |
| I.....                           | 21                             | 2                             | 9.5                           |
| II.....                          | 111                            | 3                             | 4.5                           |
| III.....                         | 133                            | 1                             | 0.7                           |

pils of the lower intelligence-quotient groups show high achievement than the pupils of the higher intelligence-quotient groups show low achievement.

Chronological age of the cases.-- At the time of



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their entrance into grade nine, the cases ranged in age from 13 years and 5 months to 16 years and 1 month. The median age of the high achievers is 1 year and 5 months greater than the median age of the low achievers. The distribution of ages in each group of cases is shown in Table 8.

Table 8. The Chronological Ages of the Cases at the Beginning of Grade Nine.

| Chronological Age<br>At Beginning of<br>Grade Nine | High<br>Achievers | Low<br>Achievers |
|----------------------------------------------------|-------------------|------------------|
| (1)                                                | (2)               | (3)              |
| 13-1 to 13-6.....                                  | 0                 | 9                |
| 13-7 to 14-0.....                                  | 1                 | 6                |
| 14-1 to 14-6.....                                  | 3                 | 0                |
| 14-7 to 15-0.....                                  | 5                 | 1                |
| 15-1 to 15-6.....                                  | 2                 | 2                |
| 15-7 to 16-0.....                                  | 5                 | 1                |
| over 16-0.....                                     | 1                 | 0                |
| Median                                             | 15-0              | 13-7             |

Place of birth and previous schooling.-- Table 9 shows that a greater percentage of the low achievers were

Table 9. Place of Birth of the Cases

| Place of<br>Birth | High Achievers     |             | Low Achievers      |             |
|-------------------|--------------------|-------------|--------------------|-------------|
|                   | Number<br>of Cases | Per<br>Cent | Number<br>of Cases | Per<br>Cent |
| (1)               | (2)                | (3)         | (4)                | (5)         |
| This Town         | 7                  | 41.2        | 12                 | 63.1        |
| Adjacent<br>Town  | 8                  | 47.0        | 6                  | 31.6        |
| Other<br>State    | 2                  | 11.8        | 1                  | 5.3         |

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born in the town in which they now live, and consequently, that a smaller number of the low achievers were born in neighboring communities or other states. It may be seen from Table 10 that a greater percentage of the low achievers received the majority of their schooling in the town where they now live.

Table 10. Location Where The Cases Received  
The Greater Part of Their Previous  
Schooling.

| Location Where<br>Greater Part of<br>Schooling Ob-<br>tained | High Achievers     |             | Low Achievers      |             |
|--------------------------------------------------------------|--------------------|-------------|--------------------|-------------|
|                                                              | Number of<br>Cases | Per<br>Cent | Number of<br>Cases | Per<br>Cent |
| (1)                                                          | (2)                | (3)         | (4)                | (5)         |
| Town of Present<br>Residence....                             | 13                 | 76.5        | 13                 | 94.7        |
| Neighboring<br>Communities..                                 | 3                  | 17.6        | 0                  | 0.0         |
| Out-of-State...                                              | 0                  | 0.0         | 1                  | 5.3         |
| Foreign Country                                              | 1                  | 5.9         | 0                  | 0.0         |

Medical and physical data.-- A summary of the medical and physical defects which each group of cases possesses is given in Table 11. The percentages of defects in each group of cases are approximately similar. A greater percentage of the high achievers than the low achievers have hearing difficulties. A greater percentage of the low achievers than the high achievers have dental defects and defects of tonsils and adenoids.

As might be expected from the age differences of the two groups of cases, the average height and the average



Table 11. The Medical and Physical Defects of the Cases.

| Nature of Defect       | High Achievers  |          | Low Achievers   |          |
|------------------------|-----------------|----------|-----------------|----------|
|                        | Number of Cases | Per Cent | Number of Cases | Per Cent |
| (1)                    | (2)             | (3)      | (4)             | (5)      |
| Vision.....            | 1               | 5.9      | 2               | 10.3     |
| Glands.....            | 2               | 11.8     | 3               | 15.3     |
| Hearing.....           | 4               | 23.5     | 1               | 5.3      |
| Speech.....            | 2               | 11.8     | 3               | 15.3     |
| Posture.....           | 6               | 35.3     | 6               | 31.6     |
| Dental.....            | 3               | 17.6     | 7               | 36.3     |
| Skin.....              | 3               | 17.6     | 2               | 10.5     |
| Tonsils and Adenoids.. | 0               | 0.0      | 5               | 26.3     |
| Other Severe           | 2               | 11.8     | 3               | 15.3     |

Weight of both sexes of the high achievers is greater than the average height and the average weight of the low achievers. This data is presented in Tables 12 and 13.

Table 12. The Height of the Cases of This Study

| Height in Inches | Boys           |               | Girls          |               |
|------------------|----------------|---------------|----------------|---------------|
|                  | High Achievers | Low Achievers | High Achievers | Low Achievers |
| (1)              | (2)            | (3)           | (4)            | (5)           |
| 57 to 59.        | 1              | 3             | 0              | 3             |
| 60 to 62.        | 2              | 4             | 4              | 3             |
| 63 to 65.        | 4              | 2             | 2              | 1             |
| 66 to 68.        | 2              | 2             | 0              | 0             |
| 69 to 71.        | 1              | 1             | 0              | 0             |
| 72 to 74.        | 1              | 0             | 0              | 0             |
| average          | 64.7           | 62.9          | 62.5           | 60.5          |

The immediate families of the cases.-- Table 14 shows that there is a greater percentage of broken homes among the low achievers. In addition, the fathers of two of the low achievers do not work steadily because of the

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Table 13. The Weight of the Cases of This Study

| Weight in Pounds | Boys           |               | Girls          |               |
|------------------|----------------|---------------|----------------|---------------|
|                  | High Achievers | Low Achievers | High Achievers | Low Achievers |
| (1)              | (2)            | (3)           | (4)            | (5)           |
| 60 or less       | 0              | 1             | 0              | 1             |
| 61 to 100        | 0              | 0             | 1              | 1             |
| 101 to 120       | 6              | 10            | 3              | 3             |
| 121 to 140       | 3              | 0             | 2              | 0             |
| 141 to 160       | 0              | 0             | 0              | 0             |
| 161 to 180       | 1              | 1             | 0              | 0             |
| over 180         | 1              | 0             | 0              | 0             |
| average          | 127            | 115           | 116            | 105           |

excess use of intoxicants.

Table 14. Parental Status of the Cases

| Parental Status      | High Achievers  |          | Low Achievers   |          |
|----------------------|-----------------|----------|-----------------|----------|
|                      | Number of Cases | Per Cent | Number of Cases | Per Cent |
| (1)                  | (2)             | (3)      | (4)             | (5)      |
| Parents Together.    | 14              | 82.3     | 12              | 63.1     |
| One Parent Dead..... | 2               | 11.3     | 1               | 5.3      |
| Parents Separated    | 1               | 5.9      | 6               | 31.6     |

A larger proportion of the parents of the high achievers were born in foreign countries. This data is shown in Table 15.

As seen in Table 16; of the high achievers, in 11.3 per cent of the cases both parents received a high-school education, in 29.4 per cent of the cases one parent received a high-school education, and in 59.6 per cent of the cases neither parent was graduated from high school.



Table 15. Place of Birth of the Parents of the Cases.

| Place of Birth of Parents | High Achievers  |          | Low Achievers   |          |
|---------------------------|-----------------|----------|-----------------|----------|
|                           | Number of Cases | Per Cent | Number of Cases | Per Cent |
| B (1)                     | (2)             | (3)      | (4)             | (5)      |
| Both Native Born.....     | 9               | 52.9     | 14              | 73.7     |
| One Native Born.....      | 1               | 5.9      | 3               | 15.6     |
| Both Foreign Born         | 7               | 41.2     | 2               | 10.5     |

Of the low achievers, in 31.6 per cent of the cases both parents received a high-school education, in 15.6 per cent of the cases one parent was graduated from high school, and in 52.6 per cent of the cases neither parent received a high-school education. The mother of one of the high

Table 16. The Education of the Parents of the Cases of This Study.

| Parents Who Received a High-School Education | High Achievers  |          | Low Achievers   |          |
|----------------------------------------------|-----------------|----------|-----------------|----------|
|                                              | Number of Cases | Per Cent | Number of Cases | Per Cent |
| (1)                                          | (2)             | (3)      | (4)             | (5)      |
| Both.....                                    | 2               | 11.8     | 6               | 31.6     |
| One.....                                     | 3               | 29.4     | 3               | 15.3     |
| Neither...                                   | 10              | 58.8     | 10              | 52.6     |

achievers received some college training; the father of one of the low achievers was graduated from college.

The classes of occupations which are pursued by the fathers of the cases is similar for the two groups of cases as shown in Table 17. The mothers of three of the

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Table 17. Occupation Classes of Pupils' Fathers.

| Occupational<br>Classification | High Achievers     |             | Low Achievers      |             |
|--------------------------------|--------------------|-------------|--------------------|-------------|
|                                | Number<br>of Cases | Per<br>Cent | Number<br>of Cases | Per<br>Cent |
| (1)                            | (2)                | (3)         | (4)                | (5)         |
| Unskilled.....                 | 5                  | 29.4        | 2                  | 10.5        |
| Skilled.....                   | 9                  | 52.9        | 9                  | 47.4        |
| Professional...                | 0                  | 0.0         | 1                  | 5.3         |
| Dead or Separated.....         | 3                  | 17.6        | 7                  | 36.6        |

High achievers and four of the low achievers worked.

The median number of siblings of the high achievers and of the low achievers is three. Table 18. presents data concerning the number of siblings of the cases.

Table 18. The Number of Siblings of the Cases.

| Number of<br>Siblings | High<br>Achievers | Low<br>Achievers |
|-----------------------|-------------------|------------------|
| (1)                   | (2)               | (3)              |
| 0.....                | 1                 | 3                |
| 1.....                | 3                 | 2                |
| 2.....                | 3                 | 4                |
| 3.....                | 2                 | 4                |
| 4.....                | 2                 | 2                |
| 5.....                | 4                 | 2                |
| 6.....                | 0                 | 0                |
| 7.....                | 1                 | 1                |
| 8 or more             | 1                 | 1                |
| median                | 3                 | 3                |

Mental data.-- From Table 19, it is noted that the educational quotients of the high achievers tends to exceed their intelligence quotients; the educational quotients of the low achievers tends to be lower than their intelli-

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Table 10. The Differences Between Intelligence Quotients and Educational Quotients of the Cases as Determined From the Otis Classification Tests.

| Educational Quotient Minus Intelligence Quotient | High Achievers  |          | Low Achievers   |          |
|--------------------------------------------------|-----------------|----------|-----------------|----------|
|                                                  | Number of Cases | Per Cent | Number of Cases | Per Cent |
| (1)                                              | (2)             | (3)      | (4)             | (5)      |
| 16 to 20.....                                    | 1               | 5.9      | 0               | 0.0      |
| 11 to 15.....                                    | 4               | 23.5     | 0               | 0.0      |
| 6 to 10.....                                     | 3               | 17.6     | 1               | 5.6      |
| 1 to 5.....                                      | 3               | 29.4     | 5               | 26.4     |
| 0.....                                           | 0               | 0.0      | 0               | 0.0      |
| -1 to -5.....                                    | 2               | 11.8     | 4               | 21.0     |
| -6 to -10.....                                   | 2               | 11.8     | 8               | 42.0     |
| -11 to -15.....                                  | 0               | 0.0      | 1               | 5.6      |
| average                                          | +4.8            |          | -3.5            |          |

gence quotients. The difference in the average educational quotients of the two groups of cases is 3.3 greater than the difference in the average intelligence quotients of the two groups. Since the classification index is midway between the intelligence quotient and the educational quotient, the difference in average classification index between the two groups is 4.2 greater than the difference between the average intelligence quotients.

The mental ages of the cases is shown in Table 20. The median mental age of the high achievers is 2 years and 6 months less than the median mental age of the low achievers.

Educational History.-- From a comparison of the number of high achievers and low achievers in each curriculum,





Table 20. The Mental Ages of the Cases

| Mental Age<br>(in years<br>and months) | High Achievers     |             | Low Achievers      |             |
|----------------------------------------|--------------------|-------------|--------------------|-------------|
|                                        | Number<br>of Cases | Per<br>Cent | Number<br>of Cases | Per<br>Cent |
| (1)                                    | (2)                | (3)         | (4)                | (5)         |
| 10-1 to 11-0                           | 2                  | 11.8        | 0                  | 0.0         |
| 11-1 to 12-0                           | 4                  | 23.5        | 0                  | 0.0         |
| 12-1 to 13-0                           | 7                  | 41.2        | 0                  | 0.0         |
| 13-1 to 14-0                           | 3                  | 17.6        | 2                  | 10.5        |
| 14-1 to 15-0                           | 1                  | 5.9         | 9                  | 47.5        |
| 15-1 to 16-0                           | 0                  | 0.0         | 4                  | 21.0        |
| over 16-0...                           | 0                  | 0.0         | 4                  | 21.0        |
| Median                                 | 12-4               |             | 14-10              |             |

the following facts are noted. In the general course, the number of high achievers is nearly twice that of the low achievers; in the commercial course, the number of high achievers is approximately one half of the number of low achievers; in the college curriculum, the number of high achievers is slightly smaller than the number of low achievers. These data are shown in Table 21. From this Table

Table 21. The Curriculum in Which the Cases Are Enrolled

| Curriculum | Total Three-<br>Year Enroll-<br>ment | High Achievers     |             | Low Achievers      |             |
|------------|--------------------------------------|--------------------|-------------|--------------------|-------------|
|            |                                      | Number<br>of Cases | Per<br>Cent | Number<br>of Cases | Per<br>Cent |
| (1)        | (2)                                  | (3)                | (4)         | (5)                | (6)         |
| General... | 32                                   | 7                  | 7.6         | 4                  | 4.3         |
| Commercial | 167                                  | 3                  | 3.6         | 10                 | 6.0         |
| College... | 125                                  | 4                  | 3.2         | 5                  | 4.0         |

it is also seen that the percentage of high achievers in the general course is approximately double that of either the commercial or college curricula. The percentage of



low achievers in the general course is about equal to the percentage of low achievers in the college course; the percentage of low achievers in the commercial course is slightly greater.

Although the differences are not large, a greater percentage of the high achievers like school; more of the low achievers possess indifferent attitudes about school attendance. Approximately the same percentage of low achievers and high achievers dislike school. This data is given in Table 22.

Table 22. School Attitudes of the Cases

| School Attitudes         | High Achievers  |          | Low Achievers   |          |
|--------------------------|-----------------|----------|-----------------|----------|
|                          | Number of Cases | Per Cent | Number of Cases | Per Cent |
| (1)                      | (2)             | (3)      | (4)             | (5)      |
| Like School..            | 10              | 53.9     | 8               | 42.0     |
| Indifferent About School | 4               | 23.5     | 7               | 37.0     |
| Dislike School.....      | 3               | 17.6     | 4               | 21.0     |

Of the high achievers, approximately one half listed science as one of two best-liked subjects. One of the high achievers listed science as one of two most-disliked subjects, and none of the high achievers listed it as their hardest subject. Of the low achievers, 18.8 per cent listed science as one of two best-liked subjects. About one third of the low achievers listed science as one of two most-disliked subjects. Three of the low achievers found sci-



ence to be their most-difficult subject. These data may be seen by reference to Table 23.

Table 23. Pupils' Attitudes About Science.

| Pupils' Atti-<br>tude About<br>Science    | High Achievers     |             | Low Achievers      |             |
|-------------------------------------------|--------------------|-------------|--------------------|-------------|
|                                           | Number of<br>Cases | Per<br>Cent | Number<br>of Cases | Per<br>Cent |
| (1)                                       | (2)                | (3)         | (4)                | (5)         |
| One of Two<br>Best-Liked<br>Subjects....  | 9                  | 52.9        | 3                  | 15.3        |
| One of Two<br>Least-Liked<br>Subjects.... | 1                  | 5.9         | 6                  | 31.6        |
| Most-Diffi-<br>cult Subject               | 0                  | 0.0         | 3                  | 15.3        |

The material shown in Table 24 presents a comparison of the previous educational history of the cases. It is

Table 24. A Comparison of the Previous Educational History of the Cases.

| Factor                                                                | High<br>Achievers | Low<br>Achievers |
|-----------------------------------------------------------------------|-------------------|------------------|
| (1)                                                                   |                   |                  |
| Percentage That<br>Received Pre-<br>Grade-One<br>Schooling.....       | 41.2              | 15.3             |
| Percentage who<br>Worry About<br>School Marks.....                    | 33.6              | 63.1             |
| Average Age At<br>Entrance In<br>Grade One (In<br>Years and Months).. | 5-10              | 5-7              |
| Average Number of<br>Grades Repeated...                               | 1.2               | 0.4              |
| Average Number of<br>Grades in Which<br>Absent 10 per cent            | 2.7               | 3.7              |





to be noted that the high achievers entered grade one at an average earlier age, repeated an average of more grades, but were absent for 10 per cent or more of the scheduled school sessions during less years than the low achievers. A substantially greater percentage of the high achievers received pre-grade-one schooling. About the same proportion of the high achievers as the low achievers worry about their school marks.

Facts concerning the pupils' educational achievements prior to their entrance in grade nine as evaluated by the Iowa Tests of Educational Development are presented in Table 25. As a group, the high achievers ranked in higher percentiles than the low achievers in Natural Science Background and also showed a slight superiority in Uses of Sources of Information. The low achievers ranked in higher percentiles than the high achievers in all other tests.

The data of Table 26. Shows the average differences between pupils' grade equivalents in English and arithmetic skills as measured by the Stanford Achievement Tests and the pupils' grade placement. The high achievers are inferior to the low achievers in all of the skills measured. The differences in reading and spelling are greater than one grade. Smaller differences are seen in language usage and arithmetic skills.



Table 22. Percentile Ranks of the Cases on the Iowa Tests of Educational Development Given in Grade 3.8.

| Test                           | High Achievers          |       | Low Achievers           |       | Difference in Favor of the High Achievers |
|--------------------------------|-------------------------|-------|-------------------------|-------|-------------------------------------------|
|                                | Average Percentile Rank | Range | Average Percentile Rank | Range |                                           |
| (1)                            | (2)                     | (3)   | (4)                     | (5)   | (6)                                       |
| Social Science Background....  | 36                      | 0-91  | 43                      | 0-90  | -13                                       |
| Natural Science Background.... | 37                      | 17-93 | 43                      | 13-91 | +11                                       |
| Correctness in Writing.....    | 39                      | 0-37  | 49                      | 2-76  | -10                                       |
| Quantitative Thinking.....     | 36                      | 2-69  | 45                      | 2-69  | - 9                                       |
| Reading Social Science.....    | 29                      | 1-65  | 46                      | 15-92 | -20                                       |
| Reading Natural Science.....   | 41                      | 3-92  | 47                      | 10-95 | - 6                                       |
| Reading Literature.....        | 35                      | 0-80  | 41                      | 7-80  | - 6                                       |
| General Vocabulary.....        | 33                      | 0-86  | 43                      | 0-91  | -10                                       |
| Uses of Sources of Information | 41                      | 0-92  | 40                      | 0-90  | + 1                                       |

Table 23. Average Differences Between Pupils' Grade Equivalents in English and Arithmetic Skills As Measured by the Stanford Achievement Tests and Pupils' Grade Placements.

| Stanford Achievement Test | Difference Between Grade Equivalents and Grade Placement |               | Differences in Favor of High Achievers |
|---------------------------|----------------------------------------------------------|---------------|----------------------------------------|
|                           | High Achievers                                           | Low Achievers |                                        |
| (1)                       | (2)                                                      | (3)           | (4)                                    |
| Reading.....              | -3.3                                                     | -0.4          | -1.2                                   |
| Language Usage.....       | -0.1                                                     | +0.1          | -0.2                                   |
| Spelling....              | -1.4                                                     | -0.3          | -1.1                                   |
| Arithmetic..              | +0.9                                                     | +1.3          | -0.4                                   |

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The data shown in Table 27 is a comparison of the marks obtained by the high achievers with those of the low achievers in grade-seven science, grade-eight science, and grade-nine mathematics. It is to be noted that in the sci-

Table 27. A Comparison of the Marks Obtained By the High Achievers with Those of the Low Achievers in Grade-Seven Science, Grade-Eight Science, and Grade-Nine Mathematics.

| Marks | Per Cent of Cases   |               |                     |               |                        |               |
|-------|---------------------|---------------|---------------------|---------------|------------------------|---------------|
|       | Grade-Seven Science |               | Grade-Eight Science |               | Grade-Nine Mathematics |               |
|       | High Achievers      | Low Achievers | High Achievers      | Low Achievers | High Achievers         | Low Achievers |
| (1)   | (2)                 | (3)           | (4)                 | (5)           | (6)                    | (7)           |
| A..   | 7.1                 | 15.6          | 0.0                 | 0.0           | 3.9                    | 0.0           |
| B..   | 28.5                | 27.7          | 26.7                | 27.7          | 29.4                   | 15.8          |
| C..   | 50.0                | 37.7          | 60.0                | 72.3          | 31.7                   | 53.0          |
| D..   | 14.3                | 0.0           | 13.3                | 0.0           | 0.0                    | 21.2          |

ence courses in grades seven and eight, none of the low achievers failed science and that slightly more than 10 per cent of the high achievers failed to pass. In other ways, the marks achieved in junior-high-school science by the two groups are similar. In grade-nine mathematics, the high achievers obtained better marks than the low achievers. The high achievers and the low achievers both carried an average load of 21 diploma credits in grade nine.

The junior-high-school teachers noted that of the high achievers, 70.6 per cent worked to the best of their

2 3 4 5 6 7 8

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  |
| 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |



abilities in junior high school; only 21 per cent of the low achievers worked to the best of their abilities.

Behavior characteristics.-- As rated by their grade-nine teachers, the high achievers possess satisfactory traits to a greater degree than the low achievers except in leadership. Reference to Table 28 shows that the high achievers received substantially higher percentages of satisfactory ratings in industry, accuracy, school adjustment, initiative, and desire to excel. Although the differences were smaller, the high achievers received higher

Table 28. Percentages of Cases Who Were Rated as Satisfactory in Traits By Their Grade-Nine Teachers.

| Traits                   | Percentage Rated Satisfactory |               |
|--------------------------|-------------------------------|---------------|
|                          | High Achievers                | Low Achievers |
| (1)                      | (2)                           | (3)           |
| Industry.....            | 70.6                          | 26.3          |
| Emotional Control.....   | 70.6                          | 63.1          |
| Social Habits.....       | 82.4                          | 57.9          |
| Accuracy.....            | 76.5                          | 15.8          |
| School Adjustment..      | 94.2                          | 63.1          |
| Attitudes.....           | 88.3                          | 63.1          |
| Initiative....           | 64.8                          | 15.8          |
| Leadership....           | 35.3                          | 57.9          |
| Group Participation..... | 94.2                          | 79.0          |
| Self-Confidence.....     | 82.4                          | 68.5          |
| Desire To Excel.....     | 76.5                          | 36.8          |

percentages of satisfactory ratings in emotional control, social habits, attitudes, group participation, and self-



The first part of the report deals with the general situation of the country. It is a very interesting and informative study of the country's development. The author has done a great deal of research and has put together a very complete picture of the country's situation. The report is well written and is easy to read. It is a very good example of a well written report.

|     |     |     |
|-----|-----|-----|
| 1   | 2   | 3   |
| 4   | 5   | 6   |
| 7   | 8   | 9   |
| 10  | 11  | 12  |
| 13  | 14  | 15  |
| 16  | 17  | 18  |
| 19  | 20  | 21  |
| 22  | 23  | 24  |
| 25  | 26  | 27  |
| 28  | 29  | 30  |
| 31  | 32  | 33  |
| 34  | 35  | 36  |
| 37  | 38  | 39  |
| 40  | 41  | 42  |
| 43  | 44  | 45  |
| 46  | 47  | 48  |
| 49  | 50  | 51  |
| 52  | 53  | 54  |
| 55  | 56  | 57  |
| 58  | 59  | 60  |
| 61  | 62  | 63  |
| 64  | 65  | 66  |
| 67  | 68  | 69  |
| 70  | 71  | 72  |
| 73  | 74  | 75  |
| 76  | 77  | 78  |
| 79  | 80  | 81  |
| 82  | 83  | 84  |
| 85  | 86  | 87  |
| 88  | 89  | 90  |
| 91  | 92  | 93  |
| 94  | 95  | 96  |
| 97  | 98  | 99  |
| 100 | 101 | 102 |

The second part of the report deals with the specific details of the country's development. It is a very interesting and informative study of the country's development. The author has done a great deal of research and has put together a very complete picture of the country's situation. The report is well written and is easy to read. It is a very good example of a well written report.

confidence.

Study habits.-- The high achievers showed a greater percentage of use of good study practices as indicated by their answers to questions relating to their study habits. The greatest differences in the study habits of the high achievers as compared to those of the low achievers were in understanding the assignment, studying regularly, working until assignments are completed, making notations of facts to remember while studying, promptly making up work missed due to absence, and reviewing assignments previously studied. Smaller differences in the percentages of high achievers as compared to the low achievers study alone, use reference books while studying, and do homework in subjects which they dislike. There is little difference in the percentages of high achievers and low achievers who make notations of their assignments and who study ahead of their assignments. These data are shown in Table 29.

Table 29. The Study Practices of the Cases As Obtained By Questioning the Pupils.

| Study Practice                             | Percentage of Cases Using |               |
|--------------------------------------------|---------------------------|---------------|
|                                            | High Achievers            | Low Achievers |
| (1)                                        | (2)                       | (3)           |
| Make Written Notations of Assignments..... | 64.7                      | 63.1          |
| Understand Assignment..                    | 70.7                      | 51.6          |
| Study Regularly.....                       | 58.9                      | 51.6          |
| Study Alone.....                           | 100.0                     | 73.7          |
| Study Until Assignments Are Complete.....  | 88.2                      | 47.4          |



Table 29. (concluded)

| Study Practice<br>(1)                                   | Percentage of Cases Using |                      |
|---------------------------------------------------------|---------------------------|----------------------|
|                                                         | High Achievers<br>(2)     | Low Achievers<br>(3) |
| Use Reference Books While Studying.....                 | 52.9                      | 37.0                 |
| Make Notations of Facts To Remember While Studying..... | 58.9                      | 26.3                 |
| Make Up Work Missed Due To Absence Promptly..           | 88.2                      | 34.6                 |
| Do Homework In Subjects Disliked.....                   | 100.0                     | 63.1                 |
| Review Assignments Previously Studied.....              | 58.8                      | 31.6                 |
| Study Ahead of Assignments.....                         | 29.4                      | 26.3                 |

Environment.-- The data given in Table 30 shows the environment of the cases. From this table it may be seen that the low achievers as a group live in slightly better neighborhoods than do the high achievers.

Table 30. Types of Neighborhoods in Which the Cases Live As Rated By Two Life-Long Residents of the Town.

| Type of Neighborhood<br>(1) | Percentage Residing in Neighborhood |                      |
|-----------------------------|-------------------------------------|----------------------|
|                             | High Achievers<br>(2)               | Low Achievers<br>(3) |
| Excellent.....              | 17.6                                | 15.8                 |
| Good.....                   | 5.9                                 | 47.4                 |
| Fair.....                   | 47.0                                | 21.0                 |
| Poor.....                   | 29.4                                | 15.8                 |

As seen in Table 31, a slightly greater percentage of the parents of the high achievers own their homes and speak a foreign language. The average number of books in



the homes of the high achievers is approximately equal to the average number of books in the homes of the low achievers.

Table 31. Home Factors of the Cases.

| Factor                                                       | High<br>Achievers | Low<br>Achievers |
|--------------------------------------------------------------|-------------------|------------------|
| (1)                                                          | (2)               | (3)              |
| Percentage of Parents Who Own Their Homes.....               | 64.8              | 52.7             |
| Percentage of Homes In Which Foreign Language Is Spoken..... | 29.4              | 10.5             |
| Average Number of Books At Home...                           | 114               | 109              |

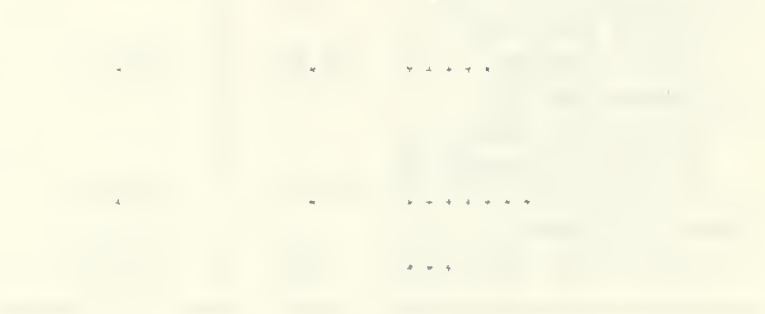
Interests and leisure activities.-- The interests and leisure activities of the high achievers is compared with those of the low achievers in Table 32. Substantially greater percentages of high achievers than low achievers take part in the following activities: making and fixing things; draw, paint, model, or design; garden, care for pets; belong to the Community House; and solve puzzles. Although the differences are small, the high achievers have greater interests than the low achievers in playing a musical instrument and singing, attending church or Sunday school, going to parties, going to dances, studying nature, and working after school.

Substantially higher percentages of the low achievers

THE UNIVERSITY OF CHICAGO  
DEPARTMENT OF CHEMISTRY

RESEARCH REPORT  
ON THE CHEMISTRY OF

THE NITROGEN ATOMS IN



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HEREIN.

BY

THE RESEARCHERS  
OF THE

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Table 32. The Interests and the Leisure Activities of the High Achievers Compared With Those of the Low Achievers.

| Interest or Leisure Activity           | Percentage Who Participate |               |
|----------------------------------------|----------------------------|---------------|
|                                        | High Achievers             | Low Achievers |
| (1)                                    | (2)                        | (3)           |
| Read Library Books.....                | 29.4                       | 57.9          |
| Read Newspapers.....                   | 76.5                       | 94.8          |
| Read Comic Books.....                  | 47.0                       | 79.0          |
| Play a Musical Instrument or Sing..... | 41.2                       | 31.6          |
| Collect Things.....                    | 35.3                       | 47.5          |
| Make or Fix Things.....                | 82.4                       | 47.5          |
| Keep a Diary or a Scrapbook.....       | 17.6                       | 26.4          |
| Draw, Paint, Model, or Design.....     | 70.6                       | 26.4          |
| Write Poems or Stories..               | 0.0                        | 26.4          |
| Help at Home.....                      | 76.5                       | 84.3          |
| Garden.....                            | 76.5                       | 37.0          |
| Care for Pets.....                     | 58.0                       | 31.6          |
| Belong to Community House.....         | 52.9                       | 31.6          |
| Play Indoor Games.....                 | 64.7                       | 79.0          |
| Attend Church or Sunday school.....    | 100.0                      | 94.8          |
| Go To Parties.....                     | 82.4                       | 73.7          |
| Go to Dances.....                      | 70.7                       | 68.5          |
| Belong To School Clubs..               | 29.4                       | 42.0          |
| Work in a Laboratory....               | 0.0                        | 5.3           |
| Solve Puzzles.....                     | 70.7                       | 42.0          |
| Study Nature.....                      | 35.3                       | 15.8          |
| Belong To Scouts.....                  | 29.4                       | 37.0          |
| Work After School.....                 | 41.2                       | 37.0          |
| Play Outdoor Games.....                | 94.2                       | 94.8          |

than the high achievers take part in the following activities: reading library books, newspapers, and comic books; and writing poems or stories. Although the differences are small, more of the low achievers than the high achievers have interests in collecting things, keeping diaries and scrapbooks, helping at home, playing indoor games,



belonging to school clubs, and belonging to the scouts. Similar percentages of the high and low achievers play outdoor sports.

Pupils' associates.-- The associates of the high achievers are compared with those of the low achievers in Table 33. Although the differences are not large, it is seen that a greater percentage of the high achievers associate with the other sex, go with pupils of their own age, and are leaders of groups.

Table 33. The Associates of the Cases.

| Factor                                     | Percentage of Cases |               |
|--------------------------------------------|---------------------|---------------|
|                                            | High Achievers      | Low Achievers |
| (1)                                        | (2)                 | (3)           |
| Associate With Other Sex.....              | 82.4                | 68.4          |
| Associate With Children Their Own Age..... | 52.8                | 47.3          |
| Leader of a Group                          | 41.2                | 31.6          |

Future plans.-- Although the differences are small, it may be seen in Table 34. that a greater percentage of the high achievers than of the low achievers intend to complete their high-school education, have decided to secure post-high-school training, and have decided on post-high-school careers. A slightly greater percentage of the parents of the high achievers than the parents of the low achievers encourage their children to complete high school.



There is little difference between the two groups in the percentage of pupils who state that they think about their future.

Table 34. Future Plans of the Cases.

| Future Plans                                        | percentage of Cases |               |
|-----------------------------------------------------|---------------------|---------------|
|                                                     | High Achievers      | Low Achievers |
| (1)                                                 | (2)                 | (3)           |
| Complete Their High-School Education...             | 94.2                | 79.0          |
| Parents Desiring Pupil To Complete High School..... | 94.2                | 84.3          |
| Secure Post-High-School Education...                | 23.5                | 15.8          |
| Made a Decision on a Post-High-School Career.....   | 58.8                | 42.0          |
| Think About Their Future.....                       | 64.7                | 68.5          |





## CHAPTER V

### A COMPARATIVE SUMMARY OF THE FACTORS ASSOCIATED WITH THE HIGH ACHIEVEMENT OF PUPILS WITH LOW INTELLIGENCE QUOTIENTS AND THOSE ASSOCIATED WITH THE LOW ACHIEVEMENT OF PUPILS WITH HIGH INTELLIGENCE QUOTIENTS

A review of the case histories, tables, and statistics leads to the following conclusions.

1. Achievement varying from their intelligence quotients by two or more standard deviations is found in 12.6 per cent of the boys and in 6.5 per cent of the girls enrolled in grade-nine science.

2. In the total enrollment in grade-nine science, the percentage of pupils whose achievement group is at least two groups above their intelligence-quotient group is approximately equal to the percentage of pupils whose achievement group is at least two groups lower than their intelligence-quotient group; each group consists of about 5 per cent of the total enrollment.

3. The percentage of pupils classified in each intelligence-quotient group who are high achievers<sup>1/</sup> decreases as the mean intelligence quotient of the group increases. The percentage of pupils classified in each intelligence-quotient group who are low achievers decreases as the mean intelligence quotient of the group decreases. The percentage of high achievers in the lowest intelligence-quotient

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<sup>1/</sup> See footnote on page 134.



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group is more than twice as great as the percentage of low achievers in the highest intelligence-quotient group.

4. The median age of the high achievers is 1 year and 5 months greater than the median age of the low achievers.

5. A greater percentage of the low achievers than of the high achievers were born in the town in which they now live. Similarly, a greater percentage of the high achievers than of the low achievers received the majority of their previous schooling in the town in which they now live.

6. The low achievers show a greater percentage of defects in their teeth, tonsils, and adenoids. A greater percentage of defects is found among the high achievers in hearing and skin. As might be expected from the age difference between the two groups of cases, the average height and the average weight of both sexes of the high achievers is greater than the average height and the average weight of the low achievers.

7. A greater percentage of broken homes is found among the low achievers than among the high achievers. A larger proportion of the parents of the high achievers were born in foreign countries. There are no significant differences in the education which the parents of the cases received, nor in the classes of occupations in which



the fathers of the cases are engaged. The median number of siblings of the high achievers and of the low achievers is three.

8. The educational quotients of the high achievers tends to exceed their intelligence quotients; the educational quotients of the low achievers tends to be less than their intelligence quotients. The difference in the average educational quotients of the two groups of cases is 8.3 greater than the difference in the average intelligence quotients of the two groups.

9. The median mental age of the high achievers is 2 years and 6 months less than the median age of the low achievers.

10. In the general course, the number of high achievers is nearly twice that of the low achievers; in the commercial course, the number of high achievers is approximately one-half of the number of low achievers; in the college curriculum, the number of high achievers is slightly less than the number of low achievers. The percentage of high achievers in the general course is approximately double that of either the commercial or college curricula. The percentage of low achievers in the general course is about equal to the percentage of low achievers in the college course; the percentage of low achievers in the commercial course is slightly greater.



11. Although the differences are not large, a greater percentage of the high achievers than the low achievers like school; more of the low achievers possess indifferent attitudes about school, attendance. Approximately the same percentage of the low achievers as high achievers dislike school.

12. Of the high achievers, approximately one-half listed science as one of two best-liked subjects. One of the high achievers listed science as one of two most-disliked subjects; none of the high achievers listed it as their hardest subject. Of the low achievers, 15.8 per cent listed science as one of two best-liked subjects. About one-third of the low achievers listed it as one of two most-disliked subjects; three of them found science their most-difficult subject.

13. The high achievers entered grade one at an average earlier age, repeated an average of more grades, and were absent for 10 per cent or more of the scheduled school sessions during less years than the low achievers. A substantially greater percentage of the high achievers received pre-grade-one schooling. About the same proportion of the high achievers as low achievers worry about their school marks.

14. As a group, the high achievers ranked in higher percentiles than the low achievers in Natural Science





Background and showed a slight superiority in Uses of Sources of Information as evaluated by the Iowa Tests of Educational Development. The low achievers ranked in higher percentiles than the high achievers in other sub-tests of the Iowa Tests of Educational Development.

15. The high achievers are inferior to the low achievers in English and arithmetic skills as measured by the Stanford Achievement Tests.

16. In science courses in grades seven and eight, none of the low achievers, but more than 10 per cent of the high achievers, failed to pass. On other achievement levels, the marks achieved in junior-high-school science by the two groups of cases are roughly similar. In grade-nine mathematics, the high achievers obtained better marks than the low achievers. The junior-high-school teachers noted that of the high achievers, 70.6 per cent worked to the best of their abilities in junior high school; only 21.0 per cent of the low achievers worked to the best of their abilities.

17. As rated by their grade-nine teachers, the high achievers received substantially higher percentages of satisfactory ratings in industry, accuracy, school adjustment, initiative, and desire to excel. Although the differences were smaller, the high achievers received higher percentages of satisfactory ratings in emotional

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NOTE  
THIS NOTE IS A SUMMARY OF THE RESULTS OF THE RESEARCH  
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AT THE UNIVERSITY OF CHICAGO

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ON THE POLYMERIZATION OF VINYL MONOMERS

CONDUCTED BY DR. J. H. GOLDSTEIN

AND HIS COLLEAGUES

AT THE UNIVERSITY OF CHICAGO

control, social habits, attitudes, group participation, and self-confidence. The low achievers received a greater percentage of satisfactory ratings in leadership.

18. The greatest differences in the study habits of the high achievers as compared with the low achievers are that greater percentages of high achievers understand the assignment, study regularly, work until their assignments are complete, make notations of facts to remember while studying, promptly make up work missed due to absence, and review assignments previously studied. There is little differences in the percentages of high achievers and low achievers who make notations of their assignments and who study ahead of their assignments.

19. The low achievers as a group live in slightly better neighborhoods. A greater percentage of the parents of the high achievers than the parents of the low achievers own their own homes and speak a foreign language at home. The average number of books in the homes of the high achievers is approximately equal to the average number of books in the homes of the low achievers.

20. Substantially greater percentages of the high achievers than of the low achievers take part in the following activities: making and fixing things; draw, paint, model, or design; garden; care for pets; belong to the Community House; and solve puzzles. Although the differ-

4. The fourth part of the document discusses the implications of the findings. It suggests that the results have significant implications for the field of study and may lead to further research in this area.

5. The fifth part of the document concludes the study. It summarizes the main findings and provides a final statement on the importance of the research.

ences are small, a greater percentage of the high achievers than of the low achievers play musical instruments or sing, attend church or Sunday school, go to parties and dances, study nature, and work after school. Substantially higher percentages of the low achievers than of the high achievers read library books, newspapers, and comic books and write poems or stories. Although the differences are small, more of the low achievers than of the high achievers have interests in collections, diaries and scrapbooks, helping at home, playing indoor games, belong to clubs in school, and in belonging to the scouts. Similar percentages of the two groups of cases play outdoor sports.

20. Although the differences are not large, a greater percentage of the high achievers associate with the other sex, go with pupils of their own age, and are leaders of groups.

21. Although the differences are small, a greater percentage of the high achievers than of the low achievers intend to complete their high-school education, have decided to secure post-high-school training, and have decided on post-high-school careers. A slightly greater percentage of the parents of the high achievers than the parents of the low achievers encourage their children to complete their high-school education. There is little

difference between the two groups of cases in the percentage of pupils who state that they think about their future.





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## APPENDIX 7

## OBJECTIVE TESTS USED TO EVALUATE PUPIL ACHIEVEMENT

The teacher-made objective tests which were used to evaluate pupil achievement for the first-half year in grade-nine science during the third year of this study are given below.

## Test 1

## MACHINES

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is partly or entirely false, write FALSE in the blank at the right. Mark each statement.

1. Machines save work. 1. \_\_\_\_\_
2. Inertia is the opposing force. 2. \_\_\_\_\_
3. The amount of work done depends upon the speed at which it is done. 3. \_\_\_\_\_
4. The ability of a body to do work is known as energy. 4. \_\_\_\_\_
5. Machines make work easier for people. 5. \_\_\_\_\_
6. Work is done when a force is exerted through a distance. 6. \_\_\_\_\_
7. The unit of force is the foot-pound. 7. \_\_\_\_\_
8. Any device that helps us do work can be called a machine. 8. \_\_\_\_\_
9. If 30 pounds are lifted to a height of 5 feet, 6 foot-pounds of work are done. 9. \_\_\_\_\_

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| WENDY PINK     | 2222 S. MICHIGAN ST   | CHICAGO | IL    | 60604 |
| Xavier BLUE    | 2323 N. LAKE ST       | CHICAGO | IL    | 60610 |
| YVONNE RED     | 2424 W. MADISON ST    | CHICAGO | IL    | 60606 |
| ZACHARY ORANGE | 2525 E. WASHINGTON ST | CHICAGO | IL    | 60601 |



- 10. Work must be put into a machine before it will do work. 10. \_\_\_\_\_
- 11. A sled will coast down a snow-covered hill because of inertia. 11. \_\_\_\_\_
- 12. Force is needed to lift a weight. 12. \_\_\_\_\_
- 13. A machine can be used to store energy. 13. \_\_\_\_\_
- 14. Work is done when an automobile coasts downhill. 14. \_\_\_\_\_
- 15. A machine can be used to make energy. 15. \_\_\_\_\_
- 16. Work is done when a force overcomes a resistance and produces motion. 16. \_\_\_\_\_
- 17. A horse standing still, but holding a wagon from rolling down a steep hill is doing work. 17. \_\_\_\_\_
- 18. A 100-pound boy running a mile does more work than a 100-pound boy who walks a mile. 18. \_\_\_\_\_
- 19. Friction is a type of resistance. 19. \_\_\_\_\_
- 20. A hammer is a machine. 20. \_\_\_\_\_

Directions: In the following paragraph a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing them in the proper places on the right side of the paper.

Force is a (21) or a (22). The tendency of a moving body to keep moving is called (23). If a man is unable to move a heavy object, (24) work is done. Resistance is the (25) force. The resistance between two moving objects is called

21. \_\_\_\_\_

22. \_\_\_\_\_

23. \_\_\_\_\_

24. \_\_\_\_\_

25. \_\_\_\_\_

4. The fourth part of the document discusses the implications of the findings. It suggests that the results have significant implications for the field of study and may lead to further research in this area.

5. The fifth part of the document provides a conclusion and a summary of the key findings. It reiterates the importance of the study and the need for continued research in this field.

6. The sixth part of the document includes a list of references and a bibliography. It cites the various sources used in the study and provides a comprehensive overview of the literature in this area.

7. The seventh part of the document contains a list of appendices and a glossary. It includes additional information that supports the findings of the study and provides definitions for key terms and concepts.

8. The eighth part of the document is a list of footnotes and a list of figures. It provides further details on the data and the analysis, and includes a list of the figures used in the study.

9. The ninth part of the document is a list of tables and a list of equations. It includes a list of the tables used in the study and a list of the equations used in the analysis.

10. The tenth part of the document is a list of figures and a list of tables. It includes a list of the figures used in the study and a list of the tables used in the analysis.



ed (26). Gravity is the (27) of the earth 26. \_\_\_\_\_  
 for all objects. To do work a machine re- 27. \_\_\_\_\_  
 quires (28). The amount of work done is 28. \_\_\_\_\_  
 found by multiplying the (29) times (30). 29. \_\_\_\_\_  
 The five types of resistance that machines 30. \_\_\_\_\_  
 overcome are (31), (32), (33), (34) and 31. \_\_\_\_\_  
 (35). 32. \_\_\_\_\_

Directions: Each of the following state- 33. \_\_\_\_\_  
 ments can be answered by one of five  
 phrases. Place in the blank at the right 34. \_\_\_\_\_  
 of the statement, the letter of the phrase  
 which gives the best answer to the state- 35. \_\_\_\_\_  
 ment.

36. When work is done, a force overcomes  
 (a) resistance, (b) energy, (c) work,  
 (d) power, (e) machine. 36. \_\_\_\_\_
37. The rate at which work is done is  
 known as (a) inertia, (b) gravity,  
 (c) power, (d) foot-pounds? (e) force. 37. \_\_\_\_\_
38. A machine is valuable to man, because  
 it (a) can do work without energy,  
 (b) goes for a long time, (c) saves  
 work, (d) makes work easier, (e) is  
 cheaper. 38. \_\_\_\_\_
39. The amount of force needed to lift 50  
 pounds two feet in the air is (a) 50  
 pounds, (b) 100 foot-pounds, (c) 100  
 pounds, (d) 50 foot-pounds, (e) 2 foot-  
 pounds. 39. \_\_\_\_\_
40. It requires more force to start a load-  
 ed wagon than to keep it going after it  
 is moving because of (a) gravity, (b)  
 inertia, (c) energy, (d) power, (e) work.  
 40. \_\_\_\_\_



## Test 2

## MACHINES

Directions: In the following paragraph a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing it in the proper place on the right side of the page.

The point on which a lever turns is 1. \_\_\_\_\_  
 called the (1). A wheelbarrow is in the 2. \_\_\_\_\_  
 (2) class of machines. The longer an in- 3. \_\_\_\_\_  
 clined plane, the (3) is the mechanical 4. \_\_\_\_\_  
 advantage. (4) between brake drums and 5. \_\_\_\_\_  
 wheels is the force that stops automobiles. 6. \_\_\_\_\_  
 A block and tackle works the same as the 7. \_\_\_\_\_  
 simple machine called the (5). The advan- 8. \_\_\_\_\_  
 tage of using a combination of simple ma- 9. \_\_\_\_\_  
 chines is (6). The distance between two 10. \_\_\_\_\_  
 successive points on a screw is known as (7). To ob-  
 tain the greatest mechanical advantage when using a  
 lever, the (8) lever should be chosen; the resistance-  
 arm should be as (9) as possible, the effort-arm as (10)  
 as possible.

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is partly or entirely false, write FALSE in the blank at the right. Mark each statement.

11. Cohesion is the attraction between 11. \_\_\_\_\_  
 the molecules of a substance.



12. A machine with a large mechanical advantage is easier to use than one with a small mechanical advantage. 12. \_\_\_\_\_
13. Output of a machine is always greater than input. 13. \_\_\_\_\_
14. A wedge is a special type of inclined plane. 14. \_\_\_\_\_
15. The wheel and axle is a simple machine. 15. \_\_\_\_\_
16. By using a force on the rim of a wheel, a greater resistance can be overcome at the axle. 16. \_\_\_\_\_
17. Some machines are 100 per cent efficient. 17. \_\_\_\_\_
18. Sliding friction is less than rolling friction. 18. \_\_\_\_\_
19. Friction is very useful to us. 19. \_\_\_\_\_
20. Decreasing the friction of a machine, increases its efficiency. 20. \_\_\_\_\_
21. Input divided by output gives the efficiency of a machine. 21. \_\_\_\_\_
22. If a machine multiplies force, it loses distance. 22. \_\_\_\_\_
23. Work is lost when we use a machine. 23. \_\_\_\_\_
24. A small wheel and a large axle is easier to use than a large wheel and a small axle. 24. \_\_\_\_\_
25. If the force arm and the weight arm of a lever are equal, the mechanical advantage is 2. 25. \_\_\_\_\_

Directions: Solve the following problems. Place your answer in the like-numbered blank on the right side of the page. Use the back of this paper if you need extra room.





A 100- pound barrel is rolled up a 15 foot plank (inclined plane) into a truck. The truck is 5 feet from the ground. It took 50 pounds of force to roll the barrel up the plank.

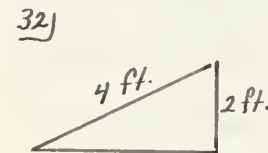
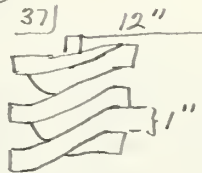
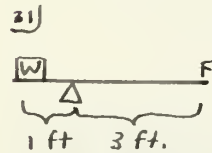
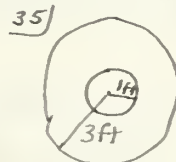
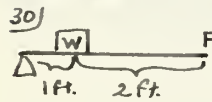
The work put into the machine is (26). 26. \_\_\_\_\_

The work gotten from the machine is (27). 27. \_\_\_\_\_

The mechanical advantage is (28). 28. \_\_\_\_\_

The efficiency of the machine is (29). 29. \_\_\_\_\_

Directions: Write the mechanical advantage of the below-pictured machines in the like-numbered blanks.



30. \_\_\_\_\_

31. \_\_\_\_\_

32. \_\_\_\_\_

33. \_\_\_\_\_

34. \_\_\_\_\_

35. \_\_\_\_\_

36. \_\_\_\_\_

37. \_\_\_\_\_

Directions: From the list of answers above the following paragraph, pick out the correct one for each question. Place the letter of the answer that best matches in the space at the right. Use each answer once only.

- A. 100 per cent
- B. 0 per cent
- C. Babbit metal
- D. Complex machine
- E. Inclined plane
- F. Jackscrew

- G. Jewel
- H. Pulley
- I. Single fixed pulley
- J. Single movable pulley
- K. Wedge

A machine used to change the direction of a force is \_\_\_\_\_

A hard mineral used to reduce friction \_\_\_\_\_





- The simple machine with the greatest mechanical advantage. 40. \_\_\_\_\_
- The simple machine with the smallest efficiency. 41. \_\_\_\_\_
- A machine used to move objects from one level to another. 42. \_\_\_\_\_
- A machine used to lift objects to great heights. 43. \_\_\_\_\_
- A machine made up of more than one simple machine. 44. \_\_\_\_\_
- The efficiency of a machine with no friction 45. \_\_\_\_\_

### Test 3

#### USES OF ENERGY

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is partly or entirely false, write FALSE in the blank at the right. Mark each statement.

1. Energy can be made. 1. \_\_\_\_\_
2. Energy can be destroyed. 2. \_\_\_\_\_
3. Energy can be changed from one type to another. 3. \_\_\_\_\_
4. Most water wheels are today used to generate electric power. 4. \_\_\_\_\_
5. Wind and moving water possess kinetic energy. 5. \_\_\_\_\_
6. A water wheel changes energy into rotary motion. 6. \_\_\_\_\_
7. A disadvantage of using a windmill is that the wind does not blow steadily. 7. \_\_\_\_\_
8. A Pelton wheel is turned by slowly moving water. 8. \_\_\_\_\_



9. The energy of water and wind is cheap. 9. \_\_\_\_\_
10. The blades of a windmill are set at an angle. 10. \_\_\_\_\_
11. Windmills can be located on hills or in valleys. 11. \_\_\_\_\_
12. The real source of energy that runs our machines is the sun. 12. \_\_\_\_\_
13. Water power is an important reason for the location of factories in certain places. 13. \_\_\_\_\_
14. Only part of the available water power is being used. 14. \_\_\_\_\_
15. Frequently rivers are twice as large in the spring as they are in the fall. 15. \_\_\_\_\_
16. A large number of blades are present in a turbine. 16. \_\_\_\_\_
17. Most of the sources of water power are located near our large cities. 17. \_\_\_\_\_
18. Turbines are not very efficient. 18. \_\_\_\_\_
19. A disadvantage of using water power to generate electricity is the great cost of building dams. 19. \_\_\_\_\_
20. The word "eccentric" means off-center. 20. \_\_\_\_\_

Directions: In the following paragraph, a word or a phrase has been left out where each numbered blank appears. Show that you know the word or phrase by writing them in the proper places on the right side of the page.

Water is able to perform work when it 21. \_\_\_\_\_  
 is in a (21) position. Energy from a 22. \_\_\_\_\_  
 "flashy" stream can be used in the (22) 23. \_\_\_\_\_  
 season to carry the main load which is 24. \_\_\_\_\_

1. The first part of the report deals with the general situation of the country and the position of the various groups of the population. It is a very interesting and informative study of the social and economic conditions of the country.

2. The second part of the report deals with the political situation of the country. It is a very interesting and informative study of the political conditions of the country.

3. The third part of the report deals with the cultural situation of the country. It is a very interesting and informative study of the cultural conditions of the country.

4. The fourth part of the report deals with the economic situation of the country. It is a very interesting and informative study of the economic conditions of the country.

5. The fifth part of the report deals with the social situation of the country. It is a very interesting and informative study of the social conditions of the country.

6. The sixth part of the report deals with the legal situation of the country. It is a very interesting and informative study of the legal conditions of the country.

7. The seventh part of the report deals with the educational situation of the country. It is a very interesting and informative study of the educational conditions of the country.

8. The eighth part of the report deals with the health situation of the country. It is a very interesting and informative study of the health conditions of the country.

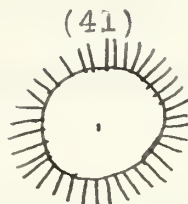
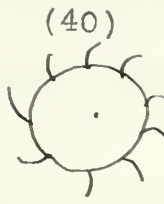
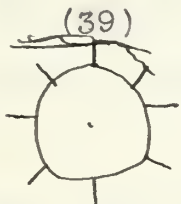
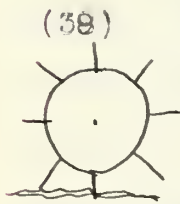
9. The ninth part of the report deals with the environmental situation of the country. It is a very interesting and informative study of the environmental conditions of the country.

10. The tenth part of the report deals with the international situation of the country. It is a very interesting and informative study of the international conditions of the country.



carried by (23) during the dry season. 25. \_\_\_\_\_  
 Water is constantly being raised to great 26. \_\_\_\_\_  
 heights because of (24). Energy of the 27. \_\_\_\_\_  
 wind is made useful by the use of (25). Five 28. \_\_\_\_\_  
 different types of energy are (26), (27), 29. \_\_\_\_\_  
 (28), (29), and (30). The energy of posi- 30. \_\_\_\_\_  
 tion is (31). The type of water wheel used 31. \_\_\_\_\_  
 where there is a large fall of water is 32. \_\_\_\_\_  
 the (32). The most efficient type of water 33. \_\_\_\_\_  
 wheel is the (33). Four ways in which a 34. \_\_\_\_\_  
 Pelton wheel differs from a turbine are 35. \_\_\_\_\_  
 (34), (35), (36), and (37). 36. \_\_\_\_\_

Directions: Identify the following water 37. \_\_\_\_\_  
 wheels by writing the name in the like- 38. \_\_\_\_\_  
 numbered blank at the right.



39. \_\_\_\_\_  
 40. \_\_\_\_\_  
 41. \_\_\_\_\_

#### Test 4

#### ENGINES

Directions: In the following paragraph a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing it in the proper places on the right side of the page.

In a steam engine (1) energy is 1. \_\_\_\_\_  
 changed to (2) energy. One part of a 2. \_\_\_\_\_





boiler holds (3), the other part contains 3. \_\_\_\_\_  
 (4). The (5) of a steam engine moves back 4. \_\_\_\_\_  
 and forth. The (6) keeps an engine run- 5. \_\_\_\_\_  
 ning smoothly. The wheels which move a 6. \_\_\_\_\_  
 train are known as (7). Steam turbines are 7. \_\_\_\_\_  
 slowed down by use of (8). In a gasoline 8. \_\_\_\_\_  
 engine, the fuel is burned in the (9). The 9. \_\_\_\_\_  
 order of strokes in a four-cycle engine is 10. \_\_\_\_\_  
 (10), (11), (12), and (13). The exhaust 11. \_\_\_\_\_  
 valve is open during the (14) stroke. The 12. \_\_\_\_\_  
 intake valve is open during the (15) 13. \_\_\_\_\_  
 stroke. Both valves are closed during the 14. \_\_\_\_\_  
 (16) and (17) strokes. A mixture of gaso- 15. \_\_\_\_\_  
 line and (18) is burned in a gasoline en- 16. \_\_\_\_\_  
 gine. (19) and (20) are the substances 17. \_\_\_\_\_  
 formed by the explosions in an automobile 18. \_\_\_\_\_  
 engine. 19. \_\_\_\_\_

Directions: Read each statement carefully. 20. \_\_\_\_\_  
 If you think that the statement is true,  
 write TRUE in the like-numbered blank at the right. If  
 you think that the statement is partly or entirely false,  
 write FALSE in the blank at the right. Mark each state-  
 ment.

21. A steam engine is like an internal 21. \_\_\_\_\_  
 combustion  
 22. Most steam engines are small in size. 22. \_\_\_\_\_  
 23. Steam molecules have kinetic energy. 23. \_\_\_\_\_

1. The first part of the paper discusses the importance of understanding the underlying mechanisms of the observed phenomena. This is crucial for developing effective interventions and policies. The authors argue that a comprehensive understanding of the system is necessary to address the complex challenges it presents.

2. The second part of the paper focuses on the methodology used in the study. The authors describe the data collection process, the statistical models employed, and the validation techniques used to ensure the reliability of the results. They emphasize the importance of transparency in reporting the methods and the limitations of the study.

3. The third part of the paper presents the results of the analysis. The authors show that the proposed model accurately captures the key features of the data and provides valuable insights into the underlying dynamics. They discuss the implications of these findings for the field and suggest directions for future research.

4. The final part of the paper concludes with a summary of the main findings and a discussion of the broader implications. The authors stress the need for continued research and collaboration to address the challenges posed by the system. They also highlight the potential for the findings to inform policy and practice.

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2. Doe, A. (2019). A new approach to understanding the dynamics of complex systems. *Journal of Systems Science*, 15(2), 101-115.

3. Lee, S. (2020). The role of technology in addressing global challenges. *Journal of Technology Management*, 8(1), 23-35.

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24. A steam turbine is like a windmill run by steam. 24. \_\_\_\_\_
25. A cylinder is similar to the inside of a tin can. 25. \_\_\_\_\_
26. The safety valve on a boiler opens when the pressure is small. 26. \_\_\_\_\_
27. Steam engines are about 50 per cent efficient. 27. \_\_\_\_\_
28. A turbine changes the energy of moving steam into rotary motion. 28. \_\_\_\_\_
29. A turbine is larger than a steam engine which gives the same power. 29. \_\_\_\_\_
30. A steam engine can be reversed. 30. \_\_\_\_\_
31. A steam turbine can be reversed. 31. \_\_\_\_\_
32. Steam turbines are widely used on ships. 32. \_\_\_\_\_
33. A gasoline engine gives more power than a steam engine of the same size. 33. \_\_\_\_\_
34. The piston moves up and down during the intake stroke. 34. \_\_\_\_\_
35. Large spark plugs are used in diesel engines. 35. \_\_\_\_\_
36. A vacuum exists in the cylinder during the exhaust stroke. 36. \_\_\_\_\_
37. A diesel engine burns gasoline. 37. \_\_\_\_\_
38. A diesel engine has no carburetor. 38. \_\_\_\_\_
39. The weight of diesel engines is a drawback to their use. 39. \_\_\_\_\_
40. Automobile valves must fit tightly. 40. \_\_\_\_\_

Directions: From the list of answers above the following paragraph, pick out the correct one. Place the letter of



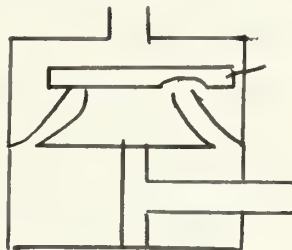
the answer that matches in the space to the right. Use each answer once only.

- |                |                 |                   |
|----------------|-----------------|-------------------|
| A. Coal        | E. Intake       | I. Steam pressure |
| B. Compression | F. Pelton wheel | J. Turbine        |
| C. Cylinder    | G. Power        | K. Valve          |
| D. Heat        | H. Safety valve |                   |

- |                                                         |           |
|---------------------------------------------------------|-----------|
| 41. Chamber in which piston moves.                      | 41. _____ |
| 42. Device used to prevent boilers from exploding.      | 42. _____ |
| 43. Energy which changes water into steam.              | 43. _____ |
| 44. Force that moves piston.                            | 44. _____ |
| 45. Most efficient type of water wheel.                 | 45. _____ |
| 46. Part of engine that lets steam into cylinder.       | 46. _____ |
| 47. Stroke during which gasoline is burned.             | 47. _____ |
| 48. Stroke during which pressure in cylinder decreases. | 48. _____ |
| 49. Water wheel with curved buckets.                    | 49. _____ |

Directions: In the following diagram of a steam engine, label the following parts:

- 50. Cylinder
- 51. Valve
- 52. Piston
- 53. Piston rod



Test 5

### ENGINES AND POWER

Directions: Compare the various engines which we have studied by completing the following table.





| Steam<br>turbine | Reciprocating<br>Steam Engine | Gasoline<br>Engine | Diesel<br>Engine |
|------------------|-------------------------------|--------------------|------------------|
| Good Points      |                               |                    |                  |
| 1.               | 7.                            | 13.                | 19.              |
| 2.               | 8.                            | 14.                | 20.              |
| 3.               | 9.                            | 15.                | 21.              |
| Bad Points       |                               |                    |                  |
| 4.               | 10.                           | 16.                | 22.              |
| 5.               | 11.                           | 17.                | 23.              |
| 6.               | 12.                           | 18.                | 24.              |

Directions: In the following paragraph a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing it in the proper places on the right side of the page.

Power is the (25) of doing work. The 25. \_\_\_\_\_  
 common unit of power is the (26). It is 26. \_\_\_\_\_  
 equal to (27) foot-pounds of work per min- 27. \_\_\_\_\_  
 ute. To calculate the horse-power of a 28. \_\_\_\_\_  
 machine, we must know (28) and (29). A 29. \_\_\_\_\_  
 three-horsepower gasoline engine does (30) 30. \_\_\_\_\_  
 foot-pounds of work each minute. The 31. \_\_\_\_\_  
 horsepower of an engine can be calculated 32. \_\_\_\_\_  
 by dividing the (31) done each (32) by (33) 33. \_\_\_\_\_

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is partly or entirely false, write FALSE in the blank at the right. Mark each statement.

34. The clutch has two main discs. 34. \_\_\_\_\_





35. The clutch can disconnect the engine from the drive shaft. 35. \_\_\_\_\_
36. The crank shaft turns the fly-wheel 36. \_\_\_\_\_
37. An extra gear is needed in order to reverse an automobile. 37. \_\_\_\_\_
38. The transmission is located on the rear axle of a car. 38. \_\_\_\_\_
39. The differential is located directly behind the fly-wheel. 39. \_\_\_\_\_

### Test 6

#### WATER TRANSPORTATION

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is false, write FALSE and make it true by replacing the underlined part with the correct one in the blank at the right.

1. A buoyant object is one that sinks. 1. \_\_\_\_\_
2. A buoyant object is neavier than the same volume of water. 2. \_\_\_\_\_
3. The center of gravity is the place where the weight seems to be concentrated. 3. \_\_\_\_\_
4. A rock under water is easier to lift than the same rock on dry land. 4. \_\_\_\_\_
5. A steel ship is shaped so that it displaces a volume of water equal to its own weight. 5. \_\_\_\_\_
6. A steel ship that displaces 20,000 tons of water, weighs 40,000 tons. 6. \_\_\_\_\_
7. A submarine is made to sink by lessening its weight. 7. \_\_\_\_\_



8. Water is taken into the diving tanks of a submarine when the submarine rises. 8. \_\_\_\_\_
9. Water in the diving tanks of a submarine is pushed out by compressed air. 9. \_\_\_\_\_
10. An object floats better in a heavier liquid than in a light one. 10. \_\_\_\_\_
11. A propeller-driven steamboat is used in shallow water. 11. \_\_\_\_\_
12. Archimede's principle is the scientific explanation as to how objects float. 12. \_\_\_\_\_
13. An object is less stable if the center of gravity is low. 13. \_\_\_\_\_
14. Smooth surfaces are used on boats to reduce the resistance of wind and water. 14. \_\_\_\_\_
15. A paddle-wheel steamboat is used in shallow water. 15. \_\_\_\_\_
16. A canoe paddle acts like a lever. 16. \_\_\_\_\_
17. A sailboat is steered by moving the keel. 17. \_\_\_\_\_
18. A submarine contains many air tanks along its sides. 18. \_\_\_\_\_
19. Vertical rudders are used to make a submarine go up and down. 19. \_\_\_\_\_
20. Water is kept out of the bottom of a diving bell by a valve. 20. \_\_\_\_\_
21. A 150-pound man whose body pushed aside 2 cu. ft. of water would weigh 150 pounds under water. 21. \_\_\_\_\_
22. A disadvantage of the sailboat is the cost of power. 22. \_\_\_\_\_





23. The keels of small boats are sometimes weighted with lead to increase their center of gravity. 23. \_\_\_\_\_
- 24.. A soda bottle standing upside down is easier to tip over, because its center of gravity is low. 24. \_\_\_\_\_
25. Vehicles are built close to the ground to make their stability lower. 25. \_\_\_\_\_
26. A bad egg floats in water, while a good egg sinks; thus the good egg has a smaller density. 26. \_\_\_\_\_
27. A propeller driving a boat acts like a wheel and axle. 27. \_\_\_\_\_
28. A disadvantage of the rowboat is that human effort is used. 28. \_\_\_\_\_
29. A small boat which weighs 3125 pounds displaces 3125 cubic feet of water. 29. \_\_\_\_\_

## Test 7

AIR TRANSPORTATION<sup>1/</sup>

## Test 8

## MAGNETISM

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is false, write FALSE and make it true by replacing the underlined part with the correct words in the place at the right.

1. Magnets can be made by hammering pieces of iron with natural magnets. 1. \_\_\_\_\_
2. The earth is a big magnet. 2. \_\_\_\_\_

<sup>1/</sup> During the third year of this study, test 6. in Earl R. Glenn and Benjamin C. Gruenberg, Instructional Tests In General Science. World Book Company, Yonkers, New York, 1932, p. 12-14 was used.





3. A piece of steel is unaffected by passing electricity through wires wrapped around it. 3. \_\_\_\_\_
4. Magnets are made in the shape of a horseshoe, in the shape of the letter U, and in the form of a straight bar. 4. \_\_\_\_\_
5. When free to move a bar magnet will race north and west. 5. \_\_\_\_\_
6. A north pole will repel a south pole. 6. \_\_\_\_\_
7. Lodestone is an example of an artificial magnet. 7. \_\_\_\_\_
8. An ordinary compass contains a horseshoe magnet that is free to move. 8. \_\_\_\_\_
9. Soft iron holds its magnetism better than hard steel. 9. \_\_\_\_\_
10. Hard steel is used to make electro-magnets. 10. \_\_\_\_\_
11. The molecules in a magnet point in many different directions. 11. \_\_\_\_\_
12. Magnetism can be conducted along a wire to another place. 12. \_\_\_\_\_
13. An electromagnet retains its magnetism when the electricity is shut off. 13. \_\_\_\_\_
14. Magnetism and electricity are the same thing. 14. \_\_\_\_\_
15. A copper bar can be made into a magnet by stroking it with a strong magnet. 15. \_\_\_\_\_
16. The middle of a magnet is called a pole. 16. \_\_\_\_\_
17. A magnetic field is made up of lines of force. 17. \_\_\_\_\_
18. Most molecules in a magnet act like magnets. 18. \_\_\_\_\_



19. The center piece of a magnet which has been cut in three pieces is non-magnetic. 19. \_\_\_\_\_
20. Dip tells us the difference between true north and the geographic north pole. 20. \_\_\_\_\_
21. The bottom of an iron fence tends to become a south pole. 21. \_\_\_\_\_
22. Heating a magnet increases its magnetism. 22. \_\_\_\_\_
23. Halfway between the poles of a magnet, there is a region of no magnetism. 23. \_\_\_\_\_
24. The electric current used with electromagnets flows through the iron. 24. \_\_\_\_\_
25. Magnetic force will go through paper. 25. \_\_\_\_\_
26. Electromagnets attract the same metals as so bar magnets. 26. \_\_\_\_\_

Directions: Answer the following questions on the back of the paper.

27. State how you can prove that a piece of metal is a magnet.
28. State how you can tell which end of a magnet is a north pole.
29. Draw the lines of force around a single bar magnet.
30. Draw the lines of force between two north poles.
31. Draw the lines of force between a north pole and a south pole.

### Test 9

### NATURE OF MATTER

10/10/10

20,000,000

10,000,000

10,000,000

10,000,000

10,000,000

10,000,000

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10,000,000

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10,000,000

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the write. If you think that the statement is partly or entirely false, write FALSE and make it true by replacing the underlined part with the correct words in the blank at the right.

1. Objects with the same numer of elec- 1. \_\_\_\_\_  
trons as protons are called nucleus.
2. Electrons are found inside the nuc- 2. \_\_\_\_\_  
leus.
3. protons spin around the nucleus at 3. \_\_\_\_\_  
high speeds.
4. Objects that have gained electrons 4. \_\_\_\_\_  
are called negative.
5. Objects that have lost electrons are 5. \_\_\_\_\_  
called neutral.
6. In the atom, the numer of electrons 6. \_\_\_\_\_  
and the number of protons is always  
the same.
7. An atom is larger than a molecule. 7. \_\_\_\_\_
8. Matter is made up of molecules. 8. \_\_\_\_\_
9. Atoms are made up of molecules. 9. \_\_\_\_\_
10. Neutrons are found outside the nuc- 10. \_\_\_\_\_  
leus.
11. The central part of the atom which 11. \_\_\_\_\_  
contains the protons is called the  
neutron.
12. The greatest part of the atom is 12. \_\_\_\_\_  
made up of the nucleus.
13. The electron is larger than the atom. 13. \_\_\_\_\_
14. The nucleus is larger than the 14. \_\_\_\_\_  
electron.





15. The proton is the same size as the electron. 15. \_\_\_\_\_
16. Most of the weight of the atom is round outside the nucleus. 16. \_\_\_\_\_
17. The proton is lighter than the electron. 17. \_\_\_\_\_

Directions: In the blank at the right of each statement, place the letter

"A" if the object is negative

"B" if the object is positive

"C" if the object is neutral

18. An object containing more electrons than protons. 18. \_\_\_\_\_
19. An object containing more protons than electrons. 19. \_\_\_\_\_
20. An object with equal numbers of protons and electrons. 20. \_\_\_\_\_
21. An electron. 21. \_\_\_\_\_
22. A proton. 22. \_\_\_\_\_
23. An atom. 23. \_\_\_\_\_
24. A neutron. 24. \_\_\_\_\_
25. A nucleus. 25. \_\_\_\_\_

Directions: In the blank at the right of each statement, place the letter

"A" if the objects repel each other

"B" if the objects attract each other

"C" if the objects have no effect on each other

26. Two negatively-charged objects. 26. \_\_\_\_\_
27. Two positively-charged objects. 27. \_\_\_\_\_
28. Two neutral objects. 28. \_\_\_\_\_
29. One negative object and one positive object. 29. \_\_\_\_\_



1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations (1) for arbitrary values of the parameters  $\alpha$  and  $\beta$ . It is shown that the system (1) has solutions for arbitrary values of the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta = 1$  is satisfied. In this case the solutions are unique and are given by the formulas (2).

2. In the second part of the paper the problem of the stability of the solutions of the system (1) is considered. It is shown that the solutions of the system (1) are stable with respect to the initial conditions if and only if the condition  $\alpha + \beta = 1$  is satisfied. In this case the solutions are stable with respect to the initial conditions and are given by the formulas (3). It is also shown that the solutions of the system (1) are stable with respect to the parameters  $\alpha$  and  $\beta$  if and only if the condition  $\alpha + \beta = 1$  is satisfied. In this case the solutions are stable with respect to the parameters  $\alpha$  and  $\beta$  and are given by the formulas (4).

3. In the third part of the paper the problem of the asymptotic behavior of the solutions of the system (1) is considered. It is shown that the solutions of the system (1) tend to zero as  $t \rightarrow \infty$  if and only if the condition  $\alpha + \beta = 1$  is satisfied. In this case the solutions tend to zero as  $t \rightarrow \infty$  and are given by the formulas (5). It is also shown that the solutions of the system (1) tend to zero as  $t \rightarrow \infty$  if and only if the condition  $\alpha + \beta = 1$  is satisfied. In this case the solutions tend to zero as  $t \rightarrow \infty$  and are given by the formulas (6).

30. A negative object and a neutral object. 30. \_\_\_\_\_
31. A positive object and a neutral object. 31. \_\_\_\_\_
32. A body that has lost electrons and one that has gained electrons. 32. \_\_\_\_\_
- 33.-37. Draw a diagram of a typical atom. Label an electron, a proton, a neutron, and the nucleus.

### Test 10

#### STATIC ELECTRICITY

Directions: In the following paragraph a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing it in the proper place on the right side of the page.

When a glass rod is rubbed with silk, 1. \_\_\_\_\_

the glass is charged (1) and the silk is 2. \_\_\_\_\_

charged (2). This shows that electrons 3. \_\_\_\_\_

have moved from the (3) to the (4). When 4. \_\_\_\_\_

a hard rubber rod is rubbed with fur, the 5. \_\_\_\_\_

fur is charged (5) and the rod is charged 6. \_\_\_\_\_

(6). This shows that electrons have moved 7. \_\_\_\_\_

from the (7) to the (8). An uncharged ob- 8. \_\_\_\_\_

ject is spoken of as being (9). Before 9. \_\_\_\_\_

lightning flashes, the cloud is (10) 10. \_\_\_\_\_

charged, the ground is (11) charged. Elec- 11. \_\_\_\_\_

trons can move from a (12) charged object 12. \_\_\_\_\_



to a (13) charged object or to a (14) 13. \_\_\_\_\_  
 charged object. Electricity that is pro- 14. \_\_\_\_\_  
 duced by friction (such as rubbing a rod) 15. \_\_\_\_\_  
 is called (15) electricity. Materials th 16. \_\_\_\_\_  
 through which electricity passes easily are 17. \_\_\_\_\_  
 called (16). Lightning is a type of (17) 18. \_\_\_\_\_  
 electricity. A condenser is made of two 19. \_\_\_\_\_  
 (18) separated by a (19).

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is partly or entirely false, write FALSE and make it true by replacing the underlined part with the correct words in the blank at the right.

20. A condenser is used to store electricity 20. \_\_\_\_\_
21. A charged object is either neutral or negative. 21. \_\_\_\_\_
22. An electroscope is used to show the presence of static electricity. 22. \_\_\_\_\_
23. An electroscope can be charged negative using a positive rod. 23. \_\_\_\_\_
24. An electroscope can be charged positive using a negative rod. 24. \_\_\_\_\_
25. An electroscope can be charged positive using a positive rod. 25. \_\_\_\_\_
26. Most lightning flashes are from one cloud to other clouds. 26. \_\_\_\_\_
27. Electricity jumps through dry air better than through moist air. 27. \_\_\_\_\_
28. It is safe to be in an automobile during a lightning storm. 28. \_\_\_\_\_





29. It is safer to stay in the center of a room than near the walls during a lightning storm. 29. \_\_\_\_\_
30. Lightning rods which are used to protect homes from damage by lightning are made of wood. 30. \_\_\_\_\_
31. During a lightning storm it is safe to stand underneath a tree which is in the middle of a field. 31. \_\_\_\_\_
32. Electrons can move easily through non-conductors. 32. \_\_\_\_\_
33. Repulsion and attraction cause electric sparks to jump through the air. 33. \_\_\_\_\_
34. When charging an electroscope by induction, the finger is removed before the rod. 34. \_\_\_\_\_
35. An electroscope can be used to tell if a charge is positive or negative. 35. \_\_\_\_\_
36. A neutral object which is attracted to a charged object is later repelled, because the charge it picks up is different. 36. \_\_\_\_\_

### Test 11

#### CURRENT ELECTRICITY

Directions: In the following paragraph, a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing it in the proper place on the right side of the page.

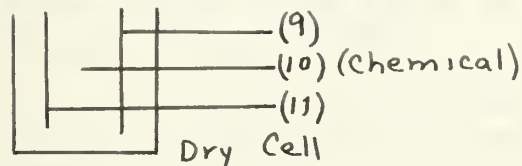
Electricity that flows through a 1. \_\_\_\_\_ wire is called (1).electricity. It is a 2. \_\_\_\_\_ movement of (2) along a wire. The path along which electricity flows is called a



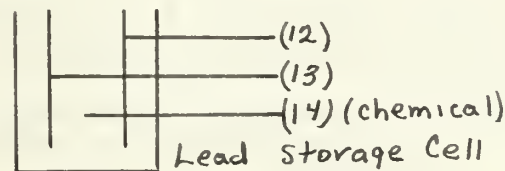


- (3). For electricity to flow, the (4) 3. \_\_\_\_\_  
 must be complete. The four parts of a use-4. \_\_\_\_\_  
 ful electric system are (5), (6), (7), and 5. \_\_\_\_\_  
 (8). 6. \_\_\_\_\_

Directions: Label the following diagrams 7. \_\_\_\_\_  
 by putting the correct answer in the pro- 8. \_\_\_\_\_  
 per place on the right side of the page.



9. \_\_\_\_\_  
 10. \_\_\_\_\_  
 11. \_\_\_\_\_



12. \_\_\_\_\_  
 13. \_\_\_\_\_  
 14. \_\_\_\_\_

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is partly or entirely false, write FALSE and make it true by replacing the underlined part with the correct words in the blank at the right.

15. Glass is a conductor of electricity. 15. \_\_\_\_\_  
 16. Electrons move easily through non-conductors. 16. \_\_\_\_\_  
 17. An electric current is a stream of electrons. 17. \_\_\_\_\_  
 18. Rubber is a non-conductor of electricity. 18. \_\_\_\_\_  
 19. A battery is made up of one cell. 19. \_\_\_\_\_  
 20. A dry cell is wet. 20. \_\_\_\_\_  
 21. When using a cell electrons flow from negative to positive. 21. \_\_\_\_\_

2. The second part of the document focuses on the financial aspects of the organization. It provides a detailed overview of the budget, including the projected income and expenses for the upcoming year. This section also includes a breakdown of the current financial status, highlighting any areas of concern and the steps being taken to address them.

3. The third part of the document addresses the operational challenges faced by the organization. It discusses the various factors that can impact the efficiency and effectiveness of the organization's operations, such as resource allocation, personnel management, and the quality of services provided. This section also outlines the strategies being implemented to overcome these challenges and improve the organization's overall performance.

4. The fourth part of the document discusses the future plans and goals of the organization. It outlines the long-term vision and the specific objectives that the organization aims to achieve in the coming years. This section also includes a discussion of the various initiatives and projects that are currently underway, as well as the resources required to implement them.

5. The fifth part of the document provides a summary of the key findings and conclusions of the report. It highlights the main points discussed in the previous sections and provides a clear and concise overview of the organization's current state and future prospects. This section also includes a list of recommendations and suggestions for further action, based on the findings of the report.

22. A battery stores electrical energy. 22. \_\_\_\_\_
23. Wires are insulated to prevent fires. 23. \_\_\_\_\_
24. A cell made up of two pieces of zinc and an acid will make a large amount of electricity. 24. \_\_\_\_\_
25. One piece of metal in a cell is always used up. 25. \_\_\_\_\_
26. A storage battery is charged by sending electricity through it. 26. \_\_\_\_\_
27. When an automobile engine is running, the battery is being charged by a generator in the car. 27. \_\_\_\_\_
28. The metal in a fuse melts when too little electricity goes through it. 28. \_\_\_\_\_
29. The part of a cell eaten by the chemical is always positive. 29. \_\_\_\_\_
30. The center part of a dry cell is negative. 30. \_\_\_\_\_
31. A hydrometer can be used to test a lead storage cell. 31. \_\_\_\_\_
32. A battery tester tells us the strength of the lead. 32. \_\_\_\_\_
33. A battery of carbon and lead cells can be recharged. 33. \_\_\_\_\_
34. Lead sulfate is the chemical formed when a lead storage cell is run down. 34. \_\_\_\_\_
35. The voltage of a lead storage cell is two volts. 35. \_\_\_\_\_
36. The voltage of three dry-cells connected together is six volts. 36. \_\_\_\_\_
37. A reading of 1180 on a battery tester shows that the battery is fully charged. 37. \_\_\_\_\_



38. The plates in a battery are separated by non-conductors. 38. \_\_\_\_\_
39. Minerals dissolved in ordinary water would spoil the plates in a battery. 39. \_\_\_\_\_
40. Chemicals can be used to make an electric current. 40. \_\_\_\_\_
41. A disadvantage of storage batteries is that they are heavy. 41. \_\_\_\_\_
42. A large cell gives a greater voltage than a small one. 42. \_\_\_\_\_
43. An electric switch breaks the circuit. 43. \_\_\_\_\_
- 44-47. Draw a diagram of a complete electric circuit using a cell, a switch, a bell, and wire.

## Test 12

### CURRENT ELECTRICITY

Directions: In the following paragraph a word or a phrase has been left out where each numbered blank appears. Show that you know the omitted word or phrase by writing it in the proper places on the right side of the page.

The unit of electrical pressure is 1. \_\_\_\_\_

the (1). The electrical pressure of a 2. \_\_\_\_\_

dry cell is (2) and of the usual house 3. \_\_\_\_\_

lighting system. (3). The unit in which 4. \_\_\_\_\_

we buy electricity is the (4). When 200 5. \_\_\_\_\_

volts goes through 10 ohms, the size of the

current is (5). Three methods of increasing





the amount of electricity made by a 6. \_\_\_\_\_  
 generator are (6), (7), and (8). The 7. \_\_\_\_\_  
 device which changes mechanical energy 8. \_\_\_\_\_  
 to electrical energy is the (9). The (10) 9. \_\_\_\_\_  
 is the unit of electrical power. The 10. \_\_\_\_\_  
 electric meter found in homes is the (11). 11. \_\_\_\_\_  
 The part of the generator which takes 12. \_\_\_\_\_  
 electricity from the rings is the (12). 13. \_\_\_\_\_  
 The moving part of the generator is 14. \_\_\_\_\_  
 called the (13). The moving part of an 15. \_\_\_\_\_  
 electric motor is the (14). The part of 16. \_\_\_\_\_  
 the generator in which electricity is 17. \_\_\_\_\_  
 made is the (15). Connections in which 18. \_\_\_\_\_  
 the entire electric current flows through 19. \_\_\_\_\_  
 each device is the (16). The two types of  
 currents are (17) and (18). The type of  
 current most commonly used is (19).

Directions: Read each statement carefully. If you think that the statement is true, write TRUE in the like-numbered blank at the right. If you think that the statement is false, write FALSE and make it true by replacing the underlined part with the correct words in the blank at the right.

20. A rectifier is used to change alter-  
nating current to direct current. 20. \_\_\_\_\_  
 21. Generators make current electricity. 21. \_\_\_\_\_  
 22. House lights are connected in series. 22. \_\_\_\_\_





23. All electrons in an alternating current flow in the same direction. 23. \_\_\_\_\_
24. Alternating currents are made in the wires of a direct current generator. 24. \_\_\_\_\_
25. The unit of electrical resistance is the watt. 25. \_\_\_\_\_
26. Ohms times amperes equals watts. 26. \_\_\_\_\_
27. Generators containing electromagnets produce larger currents than those with permanent magnets. 27. \_\_\_\_\_
28. A voltmeter is used to measure the size of an electric current. 28. \_\_\_\_\_
29. An electric motor contains an armature. 29. \_\_\_\_\_
30. An electric motor containing thick wires is able to use more electricity before burning out than one with thin wires. 30. \_\_\_\_\_
31. Direct current is obtained from a dry cell. 31. \_\_\_\_\_
32. Direct current is obtained from a lead storage battery. 32. \_\_\_\_\_
33. An alternating current generator contains a commutator. 33. \_\_\_\_\_
34. A kilowatt-hour equals 1000 watts. 34. \_\_\_\_\_
35. An 800-watt iron uses 800 watt-hours in one-half hour. 35. \_\_\_\_\_
36. A conductor breaking magnetic lines of force begins to carry an electric current. 36. \_\_\_\_\_

Directions: Answer the following questions in the like-numbered blank at the right.



What is the reading on the following meters?

37. 37. \_\_\_\_\_

38. 38. \_\_\_\_\_

39. How much electricity was used? 39. \_\_\_\_\_

40. If electricity costs 10 cents per KWH, what is the cost of the electricity used? 40. \_\_\_\_\_

41. Make a diagram of three light bulbs connected in series.

42. Make a diagram of three light bulbs connected in parallel.



## APPENDIX II

Correlation Table Showing the Relation of First Half-Year  
Marks to Yearly Marks in Grade-Nine Science

| Sum of Numerical<br>Equivalents for<br>Marks for the<br>First Half-Year | Sum of Numerical Equivalents <sup>1/</sup> for<br>Marks for the Entire Year |     |     |     |      |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |      | f    | d    | fd   | fd <sup>2</sup> | xy |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----------------|----|
|                                                                         | 23                                                                          | 22  | 21  | 20  | 19   | 18  | 17  | 16  | 15  | 14  | 13  | 12 | 11  | 10  | 9   | 8   | 7   | 6   | 5   | 4   | 3   | 2   |      |      |      |      |                 |    |
| 12.....                                                                 | 3                                                                           | 1   | 1   |     |      |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     | 5    | +6   | +30  | 180  | 312             |    |
| 11.....                                                                 | 3                                                                           |     | 5   | 3   | 2    |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     | 13   | +5   | +65  | 325  | 580             |    |
| 10.....                                                                 |                                                                             | 1   | 4   | 6   | 4    | 1   |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     | 16   | +4   | +64  | 256  | 516             |    |
| 9.....                                                                  |                                                                             |     | 1   | 1   | 9    | 14  | 6   | 10  | 1   |     |     | 1  |     |     |     |     |     |     |     |     |     |     | 43   | +3   | +129 | 387  | 711             |    |
| 8.....                                                                  |                                                                             |     |     |     |      |     | 6   | 5   | 9   | 7   | 4   | 1  |     |     | 1   |     |     |     |     |     |     |     | 33   | +2   | +66  | 132  | 184             |    |
| 7.....                                                                  |                                                                             |     |     |     |      | 1   |     | 1   | 6   | 9   | 7   | 5  | 2   | 1   |     |     |     |     |     |     |     |     | 32   | +1   | +32  | 32   | 49              |    |
| 6.....                                                                  |                                                                             |     |     |     |      |     | 1   |     | 1   | 3   | 6   | 11 | 8   | 7   | 7   | 1   |     |     |     |     |     |     | 45   | 0    | 0    | 0    | 0               |    |
| 5.....                                                                  |                                                                             |     |     |     |      |     |     |     |     |     |     | 4  | 11  | 9   | 9   | 6   | 2   |     |     |     |     |     | 41   | -1   | -41  | 41   | 90              |    |
| 4.....                                                                  |                                                                             |     |     |     |      |     |     |     |     |     | 1   |    |     | 6   | 6   | 7   | 8   | 3   |     |     |     |     | 31   | -2   | -62  | 124  | 231             |    |
| 3.....                                                                  |                                                                             |     |     |     |      |     |     |     |     |     |     |    |     | 1   | 4   | 3   | 5   | 5   | 3   | 2   | 1   |     | 24   | -3   | -72  | 216  | 381             |    |
| 2.....                                                                  |                                                                             |     |     |     |      |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     | 2   | 1   | 3    | -4   | -12  | 48   | 112             |    |
| 1.....                                                                  |                                                                             |     |     |     |      |     |     |     |     |     |     |    |     |     |     |     |     | 1   |     | 3   |     | 4   | -5   | -20  | 100  | 150  |                 |    |
| f.....                                                                  | 6                                                                           | 2   | 11  | 10  | 15   | 16  | 13  | 16  | 17  | 19  | 18  | 22 | 21  | 24  | 27  | 17  | 15  | 9   | 3   | 5   | 3   | 1   | 290  |      |      |      |                 |    |
| d.....                                                                  | +11                                                                         | +10 | +9  | +8  | +7   | +6  | +5  | +4  | +3  | +2  | +1  | 0  | -1  | -2  | -3  | -4  | -5  | -6  | -7  | -8  | -9  | -10 |      | +179 | 1841 | 3316 |                 |    |
| fd.....                                                                 | +66                                                                         | +20 | +99 | +80 | +105 | +96 | +65 | +64 | +51 | +38 | +18 | 0  | -21 | -48 | -81 | -68 | -75 | -54 | -21 | -40 | -27 | -10 | +257 |      |      |      |                 |    |
| fd <sup>2</sup> .....                                                   | 726                                                                         | 200 | 891 | 640 | 735  | 576 | 325 | 256 | 153 | 76  | 18  | 0  | 21  | 96  | 243 | 272 | 375 | 324 | 147 | 320 | 243 | 100 | 6737 |      |      |      |                 |    |

$$c_x = \frac{257}{290} = 0.89$$

$$c_y = \frac{179}{290} = 0.62$$

$$\frac{\sum xy}{N} = \frac{3316}{290} = 11.43$$

$$SD_x = \sqrt{\frac{6737}{290} - (0.89)^2} = 4.80$$

$$SD_y = \sqrt{\frac{1841}{290} - (0.62)^2} = 2.43$$

$$r = \frac{\frac{\sum xy}{N} - c_x c_y}{(SD_x)(SD_y)} = \frac{11.43 - 0.55}{(4.80)(2.43)} = 0.93$$

<sup>1/</sup> The numerical equivalent for the marks received are as follows: A equals 4, B equals 3, C equals 2, C- equals 1, and D or E equals 0. Three marking periods occur during each half-year.





## APPENDIX III

Computations of the Arithmetic Mean and the Standard Deviation of the Achievement of 1946-1947 Pupils

| Aggregate Numerical Achievement for First Half-Year | f  | d   | fd  | fd <sup>2</sup> |
|-----------------------------------------------------|----|-----|-----|-----------------|
| 248-258.....                                        | 2  | +9  | +18 | 162             |
| 237-247.....                                        | 1  | +8  | + 8 | 64              |
| 226-236.....                                        | 3  | +7  | +21 | 147             |
| 215-225.....                                        | 6  | +6  | +36 | 216             |
| 204-214.....                                        | 8  | +5  | +40 | 200             |
| 193-203.....                                        | 9  | +4  | +36 | 144             |
| 182-192.....                                        | 3  | +3  | + 9 | 27              |
| 171-181.....                                        | 4  | +2  | + 8 | 16              |
| 160-170.....                                        | 4  | +1  | + 4 | 4               |
| 149-159.....                                        | 6  | 0   | 0   | 0               |
| 138-148.....                                        | 5  | -1  | - 5 | 5               |
| 127-137.....                                        | 3  | -2  | - 6 | 12              |
| 116-126.....                                        | 12 | -3  | -36 | 108             |
| 105-115.....                                        | 2  | -4  | - 8 | 32              |
| 94-104.....                                         | 1  | -5  | - 5 | 25              |
| 83- 93.....                                         | 5  | -6  | -30 | 180             |
| 72- 82.....                                         | 5  | -7  | -35 | 245             |
| 61- 71.....                                         | 1  | -8  | - 8 | 64              |
| 50- 60.....                                         | 0  | -9  | 0   | 0               |
| 39- 49.....                                         | 1  | -10 | -10 | 100             |
| 28- 38.....                                         | 0  | -11 | 0   | 0               |
| 17- 27.....                                         | 1  | -12 | -12 | 144             |
| N = 83                                              |    |     | -25 | 1895            |

$$AM = 154 + 11\left(\frac{25}{83}\right) = 157.3$$

$$SD = 11\sqrt{\frac{1895}{83} - (0.31)^2} = 52.5$$



## APPENDIX IV

Computations of the Arithmetic Mean and the Standard Deviation of the Achievement of 1947-1948 Pupils

| Aggregate Numerical Achievement for First Half-Year | f  | d   | fd   | fd <sup>2</sup> |
|-----------------------------------------------------|----|-----|------|-----------------|
| 254-266.....                                        | 2  | + 7 | +14  | 98              |
| 241-253.....                                        | 9  | + 6 | +54  | 324             |
| 228-240.....                                        | 9  | + 5 | +45  | 225             |
| 215-227.....                                        | 19 | + 4 | +76  | 304             |
| 202-214.....                                        | 20 | + 3 | +60  | 180             |
| 189-201.....                                        | 13 | + 2 | +26  | 52              |
| 176-188.....                                        | 13 | + 1 | +13  | 13              |
| 163-175.....                                        | 20 | 0   | 0    | 0               |
| 150-162.....                                        | 16 | - 1 | -16  | 16              |
| 137-149.....                                        | 7  | - 2 | -14  | 28              |
| 124-136.....                                        | 6  | - 3 | -18  | 54              |
| 111-123.....                                        | 4  | - 4 | -16  | 64              |
| 98-110.....                                         | 3  | - 5 | -15  | 75              |
| 85- 97.....                                         | 2  | - 6 | -12  | 72              |
| 72- 84.....                                         | 0  | - 7 | 0    | 0               |
| 59- 71.....                                         | 2  | - 8 | -16  | 128             |
| 46- 58.....                                         | 0  | - 9 | 0    | 0               |
| 33- 45.....                                         | 1  | -10 | -10  | 100             |
| 20- 32.....                                         | 0  | -11 | 0    | 0               |
| 7- 19.....                                          | 0  | -12 | 0    | 0               |
| 0- 6.....                                           | 1  | -13 | -13  | 169             |
| N = 147                                             |    |     | +158 | 1902            |

$$AM = 169 + 13\left(\frac{158}{147}\right) = 13.95$$

$$SD = 13\sqrt{\frac{1902}{147} - (1.07)^2} = 44.5$$



## APPENDIX V

Computations of the Arithmetic Mean and the Standard Deviation of the Achievement of 1948-1949 Pupils

| Aggregate Numerical Achievement for First Half-Year | f  | d   | fd   | fd <sup>2</sup> |
|-----------------------------------------------------|----|-----|------|-----------------|
| 345-357.....                                        | 1  | +10 | +10  | 100             |
| 332-344.....                                        | 4  | + 9 | +36  | 324             |
| 319-331.....                                        | 8  | + 8 | +64  | 512             |
| 306-318.....                                        | 6  | + 7 | +56  | 392             |
| 293-305.....                                        | 13 | + 6 | +78  | 468             |
| 280-292.....                                        | 14 | + 5 | +70  | 350             |
| 267-279.....                                        | 11 | + 4 | +44  | 176             |
| 254-266.....                                        | 12 | + 3 | +36  | 108             |
| 241-253.....                                        | 15 | + 2 | +30  | 60              |
| 228-240.....                                        | 7  | + 1 | + 7  | 7               |
| 215-227.....                                        | 11 | 0   | 0    | 0               |
| 202-214.....                                        | 12 | - 1 | -12  | 12              |
| 189-201.....                                        | 12 | - 2 | -24  | 48              |
| 176-188.....                                        | 5  | - 3 | -15  | 45              |
| 163-175.....                                        | 8  | - 4 | -32  | 128             |
| 150-162.....                                        | 5  | - 5 | -25  | 125             |
| 137-149.....                                        | 2  | - 6 | -12  | 72              |
| 124-136.....                                        | 2  | - 7 | -14  | 98              |
| 111-123.....                                        | 1  | - 8 | - 8  | 64              |
| 98-110.....                                         | 2  | - 9 | -18  | 162             |
| 85- 97.....                                         | 0  | -10 | 0    | 0               |
| 72- 84.....                                         | 1  | -11 | -11  | 121             |
| N = 154                                             |    |     | +260 | 3372            |

$$AM = 221 + 13\left(\frac{260}{154}\right) = 242.9$$

$$SD = 13\sqrt{\frac{3372}{154} - (1.7)^2} = 55.2$$



## APPENDIX VI

Computations of the Arithmetic Mean and the Standard Deviation of the Intelligence Quotients of 1946-1947 Pupils

| Intelligence Quotient | f  | d  | fd  | fd <sup>2</sup> |
|-----------------------|----|----|-----|-----------------|
| 128-130.....          | 1  | +9 | + 9 | 81              |
| 125-127.....          | 1  | +8 | + 8 | 64              |
| 122-124.....          | 1  | +7 | + 7 | 49              |
| 119-121.....          | 6  | +6 | +36 | 216             |
| 116-118.....          | 4  | +5 | +20 | 100             |
| 113-115.....          | 2  | +4 | + 8 | 32              |
| 110-112.....          | 13 | +3 | +39 | 117             |
| 107-109.....          | 9  | +2 | +18 | 36              |
| 104-106.....          | 7  | +1 | + 7 | 7               |
| 101-103.....          | 13 | 0  | 0   | 0               |
| 98-100.....           | 3  | -1 | - 3 | 3               |
| 95- 97.....           | 4  | -2 | - 8 | 16              |
| 92- 94.....           | 5  | -3 | -15 | 45              |
| 89- 91.....           | 5  | -4 | -20 | 80              |
| 86- 88.....           | 3  | -5 | -15 | 75              |
| 83- 85.....           | 2  | -6 | -12 | 72              |
| 80- 82.....           | 3  | -7 | -21 | 147             |
| 77- 79.....           | 1  | -8 | - 8 | 64              |
| N = 83                |    |    | +50 | 1204            |

$$AM = 102 + 3\left(\frac{50}{83}\right) = 103.8$$

$$SD = 3\sqrt{\frac{1204}{83} - (0.6)^2} = 11.3$$





## APPENDIX VII

Computations of the Arithmetic Mean and the Standard Deviation of the Intelligence Quotients of 1947-1948 Pupils

| Intelligence Quotient | f  | d  | fd  | fd <sup>2</sup> |
|-----------------------|----|----|-----|-----------------|
| 138-142.....          | 1  | +8 | + 8 | 64              |
| 133-137.....          | 0  | +7 | 0   | 0               |
| 128-132.....          | 3  | +6 | +18 | 108             |
| 123-127.....          | 5  | +5 | +25 | 125             |
| 118-122.....          | 8  | +4 | +32 | 128             |
| 113-117.....          | 21 | +3 | +63 | 189             |
| 108-112.....          | 22 | +2 | +44 | 88              |
| 103-107.....          | 16 | +1 | +16 | 16              |
| 98-102.....           | 17 | 0  | 0   | 0               |
| 93- 97.....           | 15 | -1 | -15 | 15              |
| 88- 92.....           | 17 | -2 | -34 | 68              |
| 83- 87.....           | 8  | -3 | -24 | 72              |
| 78- 82.....           | 3  | -4 | -12 | 48              |
| 73- 77.....           | 6  | -5 | -30 | 150             |
| 68- 72.....           | 4  | -6 | -24 | 144             |
| 63- 67.....           | 1  | -7 | - 7 | 49              |
| N = 147               |    |    | +60 | 1264            |

$$AM = 100 + 5\left(\frac{60}{147}\right) = 102.0$$

$$SD = 5\sqrt{\frac{1264}{147} - (0.41)^2} = 13.7$$



## APPENDIX VIII

Computations of the Arithmetic Mean and the Standard Deviation of the Intelligence Quotients of 1948-1949 Pupils

| Intelligence Quotient | f   | d   | fd  | fd <sup>2</sup> |
|-----------------------|-----|-----|-----|-----------------|
| 125-127.....          | 5   | + 8 | +40 | 320             |
| 122-124.....          | 7   | + 7 | +49 | 343             |
| 119-121.....          | 6   | + 6 | +36 | 216             |
| 116-118.....          | 9   | + 5 | +45 | 225             |
| 113-115.....          | 12  | + 4 | +36 | 144             |
| 110-112.....          | 13  | + 3 | +39 | 117             |
| 107-109.....          | 20  | + 2 | +40 | 80              |
| 104-106.....          | 17  | + 1 | +17 | 17              |
| 101-103.....          | 13  | 0   | 0   | 0               |
| 98-100.....           | 5   | - 1 | - 5 | 5               |
| 95- 97.....           | 10  | - 2 | -20 | 40              |
| 92- 94.....           | 6   | - 3 | -18 | 54              |
| 89- 91.....           | 7   | - 4 | -28 | 112             |
| 86- 88.....           | 5   | - 5 | -25 | 125             |
| 83- 85.....           | 9   | - 6 | -54 | 324             |
| 80- 82.....           | 2   | - 7 | -14 | 98              |
| 77- 79.....           | 4   | - 8 | -32 | 256             |
| 74- 76.....           | 1   | - 9 | - 9 | 81              |
| 71- 73.....           | 1   | -10 | -10 | 100             |
| 68- 70.....           | 1   | -11 | -11 | 121             |
| 65- 67.....           | 0   | -12 | 0   | 0               |
| 62- 64.....           | 1   | -13 | -13 | 169             |
| N =                   | 154 |     | +63 | 2947            |

$$AM = 102 + 3 \left( \frac{63}{154} \right) = 103.2$$

$$SD = \sqrt{\frac{2947}{154} - (0.41)^2} = 13.1$$









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RETO COVLE

USE V.S.

TO DUPLICATE SHEETS

TO DUPLICATE SHEET TO NUMBER

A. P. ... Co., U.S.A.

